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A page of contents—

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1935 Yearbook

(OVER)

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Contents

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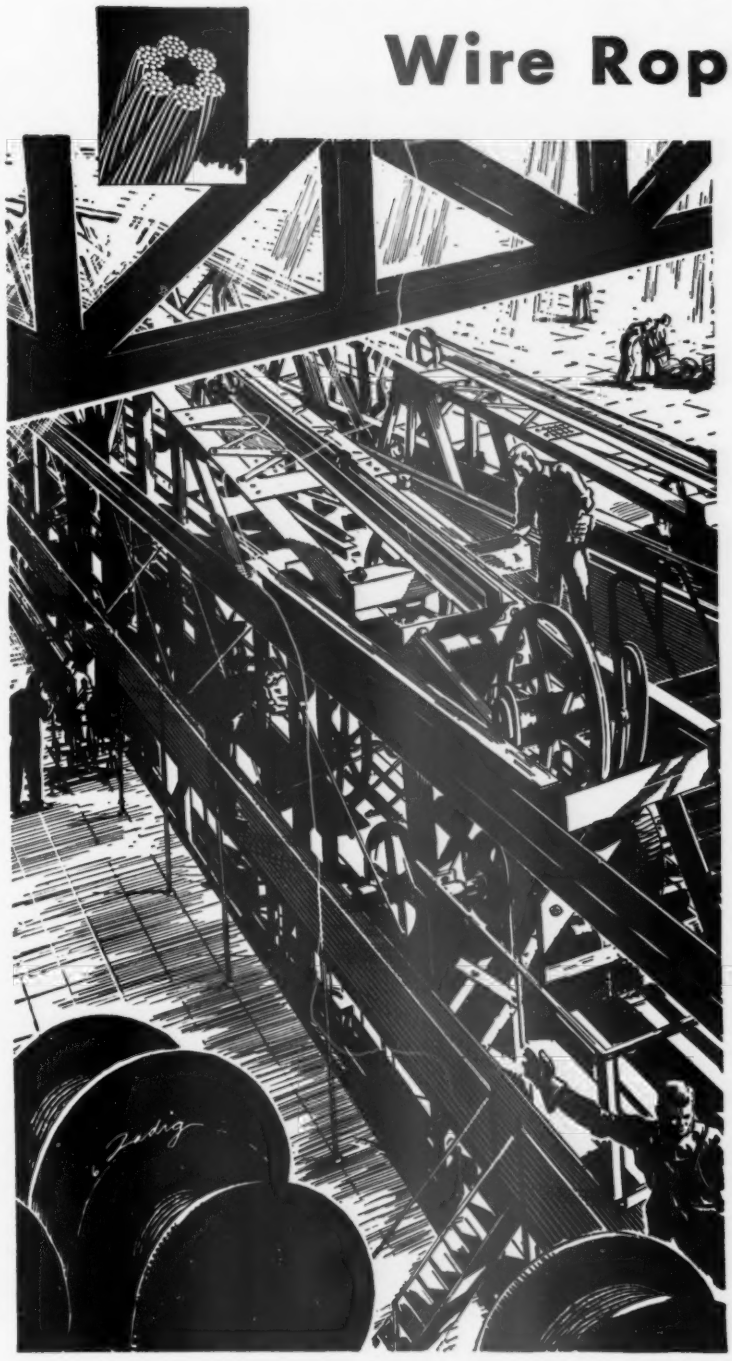

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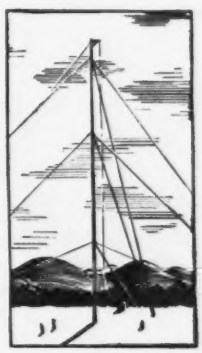

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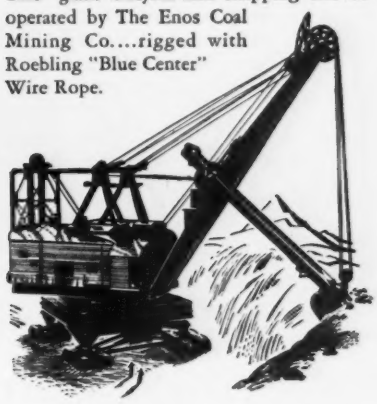

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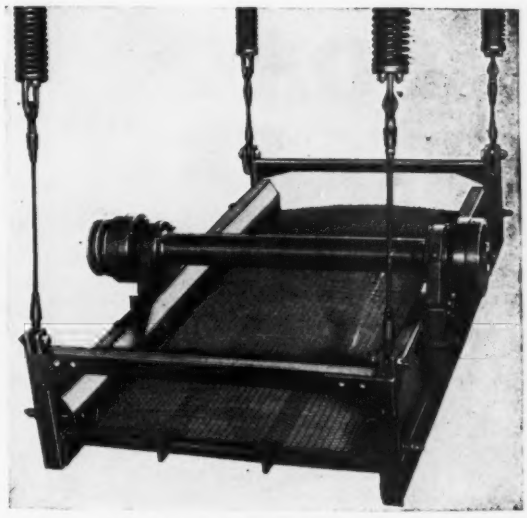

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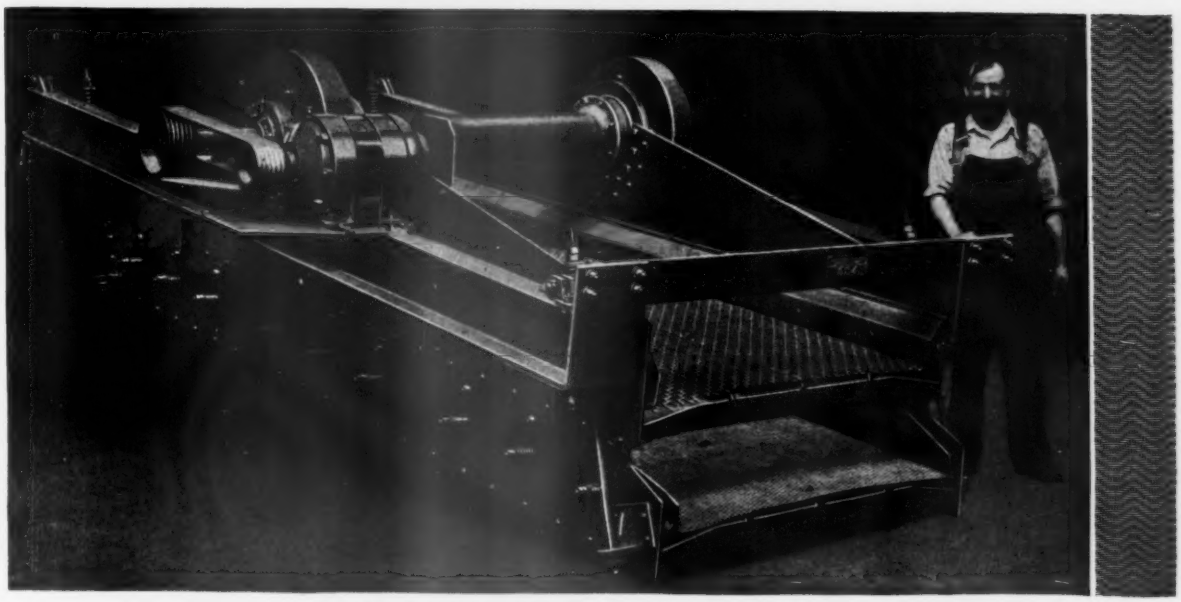

5'x14' Double Deck Style "B" Centrifugal Vibrating Screen

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The Source of Wages

NINETY percent of the cost of all goods sold upon normal markets is represented by the wages paid in the production and distribution of those goods. Wages and price levels rise and fall in any given country, not always uniformly but always toward an adjustment of price levels to wages.

This adjustment does not apply to articles to be sold in foreign markets where production costs must be adjusted to foreign wage levels. Efficient production, or in other words, cheap production, provides the only open door for exports to foreign countries. Why camouflage this situation? High cost production is a bar to foreign markets; efficient production is a key to foreign markets.

Manufacturers may well operate their plants without profit beyond the upkeep of their production plant, but this lowering of cost will not in time of depression be sufficient to command foreign markets. The only other field into which these manufacturers may seek greater production is through a decrease of labor cost. This may be accomplished either by reducing the purchasing power of the money paid in wages or by reducing the wage itself. In either case profits and wages must come from operation, and any proposal to saddle losses entirely upon the manufacturer means bankruptcy and the loss of all wage paying power.

We are being forced to recognize the fact that our chief competitors are beginning to use the same character of production machinery which until recent times has enabled us to pay high wages for short hours and still compete upon a satisfactory basis with countries where the wages are low and the hours are long.

It is easy to understand the logic of the 4,000,000 organized workers who seek through the power of organization to obtain for themselves more than a fair share of the total earnings of the 40,000,000 workers in the country. Such increased wage does not come from capital, as is supposed, but from the 36,000,000 under-paid workers of the country who are forced to pay a higher price for the goods which they must consume and thus make possible the higher wages paid to the organized worker.

If this country were able to consume all the goods which it can produce, this logic would be infallible, but we find that at least 10 percent of our total production must ordinarily be sold in foreign markets if all our production power is to be continuously employed. If these same goods can be produced in foreign countries with similar machinery and with labor costs much less than our own, we find ourselves entirely excluded from such markets, and the 10 percent surplus reduction oversupplies our domestic markets and forces unemployment.

In the world of international trade, the world is undergoing a radical revolution. For many years the British Empire manufactured for the world. Then Central European countries crept into the picture in the manufacture of certain specialized goods. Then entered the United States, which, with its improved machinery, was able to pay a high wage and still compete with England in the world market.

At one time our Southern States supplied the world's demand for raw cotton for manufacturing purposes. But when as a special aid to the cotton industry our Government insured a very high price for domestic cotton, Japan, instead of paying this price, got her raw material from Brazil and India, and not only failed to take our raw cotton but was able to a large extent to take from us our home market for our own manufactured cotton goods.

When will we realize that wages and price levels must maintain an almost corresponding level? High wages necessarily mean high priced goods. If those high priced goods can be sold to recipients of high wages a balance is maintained.

And when will we learn that our domestic market absorbs 90 percent of our production and that the protection of that domestic market should be the first care of the Government? Until recently nine-tenths of the production of our cotton goods producers was sold in domestic markets, but when the western farmer was forced to pay a price increased by the amount of the processing tax upon cotton, his consumptive power was greatly decreased, and he found it easy to turn to the imported Japanese cotton goods which could be sold at a lesser price. Human nature has not yet become so benevolent as to justify paying a higher price to one's neighbor than the price at which he can purchase the same goods from his competitor across the stream.

Selling goods below cost means loss to somebody. Business judgment will quickly shut off that loss as soon as possible.

Unless we are willing to confine our production entirely to our domestic market, and make of ourselves an entirely self-contained nation, our price levels and the cost of capital must be kept upon a par with those nations with whom we desire to compete.

The industrial world is undergoing a revolution to which we must adjust ourselves if we are to maintain our position in world commerce. Some day we shall learn that the tariff is an industrial issue and not a political issue, and the sooner we absorb this fact the sooner will we begin to reduce the number of unemployed in the United States.

The mining industry has an absorbing interest in these problems. Miners are necessarily large users of cotton goods. When the prices of these goods are raised by a processing tax, it means that the wages of the miner are worth that much less than before; that when the price of bacon, ham and pork are raised by a processing tax, and when that price is again raised by the destruction of one-third of the hog stock of the country, the miner, having to pay double for the meat for his table, finds that his wages have been reduced in a corresponding amount.

The great bulk of the wages paid to the metal miners of this country are for the production of the common metals. The market price for nearly all of the metals is today, and for several years past has been, below the actual cost of production. Wages in the metal field have always been high, but how long can the miner continue to work for the old wage when he finds that his living costs have doubled?

The wages of the metal miners of the west have been largely based upon a minimum increased by a suitable percentage of any increase of the market price of the minerals produced. The metal miner has always been ready to adjust himself to the conditions of the industry and to so adjust his wages as to permit a continuance of the mine operation as the price of its product was reduced in the general market. But under any circumstances the miner must have a living wage and such wage must be increased in proportion to the rise in the price of his necessities.

And thus it is that the mining industry has a definite interest in any plan which undertakes to raise the price level of the commodities which he must use and fails to exert a similar influence in raising the price of the metals which he produces.

The
MINING CONGRESS JOURNAL

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A Journal for the entire mining industry published by The American Mining Congress

Leadership Necessary

TODAY one-sixth of our entire population is supported by the Government. That is an alarming fact. In a very short period the Government of the United States has become a central planning plant, assuming many of the duties and prerogatives of the states, of private industry, and even of the individual. Practically nothing is being left unsupervised by Washington.

The last session of Congress, while not the most liberal with the taxpayer's money, passed with meager consideration a four-billion-eight-hundred-million appropriation bill which calls for tremendous tax support. Millions of dollars annually are being spent to force industry to conform to the theories of political and industrial reformers.

The mining industry never was faced with greater necessity for constructive leadership. Furnishing, as minerals do, the livelihood for some twenty-five million people, it is more than ordinarily concerned with the present tendency to substitute political acumen for business integrity and stability.

Policy

THE air, particularly about Washington, has been vibrant with much loose talk these past few years. The pulse of the nation has been Washington. Industry for the most part has been forced to stand still, like an obedient child, awaiting the voice of its master. The "thou shalt nots" and the "thou shalts" have been bumping each other in the rapidity with which they have been spoken, and the wires have buzzed continuously with ever new and ever more alarming mandates to industry.

It therefore is refreshing to read "A Declaration of Policy" presented by the leaders in the copper, iron, lead, zinc, silver and gold industries. A collective pronouncement of fundamental principles upon which these industry are agreed and by which each group will abide. Their joint agreement declares their "faith in the Constitution" and protests forcefully against any attempt to "nullify the intent and spirit" of this important document. They declare against bureaucracy, and urge a return to government by law instead of by executive order or administrative decree; they insist upon a balanced budget; they assert their responsibility and rights as taxpayers; and protest the growing tendency toward confiscatory and penalizing taxation, local, state and national; they oppose government competing with industrial enterprises; and collectively urge a return to the true functions of government; they urge a sound money policy; the protection of minerals and mineral products against unfair foreign competition; they oppose national relief administered by Federal agencies through a "works" program.

But most important, they pledge themselves individually and collectively to support their position with active and cooperative action. These industries wield a tremendous national influence. They support thousands —millions—of men and supply the industrial backbone of the country. We heartily endorse their position and pledge our cooperation in promoting national sanity and a return to sound principles.

Tests of Democracy

RECENTLY in Washington there was dedicated the beautiful white marble edifice known as the new Supreme Court Bulding. It is thoroughly in keeping with the dignity and importance of this country that its greatest institution should be so magnificently housed.

But the dedication of that building at this time has a deeper significance. For it is here, at its opening sesson, that the Supreme Court will decide upon the constitutionality of the Three A's; upon the Guffey coal control bill; and other of the New Deal's pet projects that many believe come dangerously near abolishing American industrial freedom. History is to be made during this session of the Court.

Our conception of a free government recognizes a separation of the legislative, administrative, and judicial functions. This time-honored principle is in the balance. The Court will decide whether the laws now upon our statute books, which apparently merge at least two of these vital functions, are constitutional.

The founders of this Government apparently foresaw some such emergency as the present, with its unparalleled centralized authority, and created the judicial branch of Government to stand between those in power and the people. The Supreme Court is the bulwark of democracy. It has stood the test of time and undoubtedly the history it is now writing will prove to posterity once again that the founders of this great Government were right.

Ignoring the Stop Sign

ONE of the principal tenets agreed to by the recent convention of the American Federation of Labor was "labor will never stop until it secures the six-hour day and the five-day week." President Green insists that in this manner only can the ten or more million unemployed be put back to work. The Government has tried many schemes to decrease unemployment, with no appreciable result, and since the proposal of the Federation is largely political, no one doubts that a real effort will be made to establish

this principle in industry at the coming session of Congress.

But before we try one more "noble experiment" we should take the cotton out of our ears and listen to what industry—which must pay the bill—has to say about it. There is sufficient testimony now in the hands of congressional committees to prove the case against the adoption of a six-hour day, five-day week backward and forward. Practically every industrial leader appearing before the committee has said unhesitatingly that to saddle industry with the six-hour day will mean an increase in unemployment and in many instances will kill or seriously cripple the industry that now furnishes employment.

In the final analysis, wages are the product of industry's capacity to produce, and so long as this is true the hours of labor must be governed by productive work. Artificially stimulated labor markets are not the answer to sound prosperity.

A Turn to the Right

FOR whatever cause official Washington seems to be inclined to mend its ways. Observers of political trends are commenting upon the apparent tendency of the Administration to make a sharp turn to the right. Some attribute the turn to a realization that the end of the rope is near; others that it will make good campaign fodder; others that fear is the dominant factor.

Whatever the reason, it is ardently hoped that the turn is a genuine one and not just another gesture. Man after man has resigned from the official family, only to turn bitter opponent of the New Deal's policies. Notable of these are the Honorable Lewis W. Douglas, former Director of the Budget, who was unable to reconcile his well known thrift views with the prodigality of the Administration; and General Hugh Johnson, who may or may not have an axe to grind.

Thus, we hear much serious talk about balanced budgets; a curtailment of political relief; an olive branch to industry to solve the unemployment problem by direct employment; the abolishment of experiment and the restriction of government to its true functions.

It may be that the political group has heard the distant but constantly increasing bellow of a long tried industrial patience, and will be guided accordingly. Certainly during the coming months rapid and expedient changes will be the order of the day.

A Tenable Premise

ALL industry is founded upon the fundamental premise of interdependence of labor and management. The most successful enterprise is that which has the least disagreement between these two elements. Rarely, if ever, is an organization so perfect that there is complete harmony in all relationships; more often than not the reverse is true. There is needless discord in many industrial units, and therefore in the industry of which the unit is a part. Impartial examination finds that both sides have cause for grievance; frequently both are wrong, and therein lies the difficulty.

In certain parts of the mining industry labor disturbances have been frequent and violent. The relationship between those who hire and those who work for wages has not established an enviable record. Individual units have established high records, but not a sufficient number of them to insure satisfactory performance for the entire industry. Individually mine operators are the "cream of the crop"; collectively they have failed in an important objective—an industry with continuously peaceful labor records.

But whatever the present situation it is vastly an improvement over the past. Great progress is being made in human relationships. More and more groups—both capital and labor—are learning the reward for "teamwork"; more and more labor leaders are substituting discussion for coercion. So long as there are men and different opinions, there will be disputes. But a real effort to arrive at fair return to capital, fair wages to workers, and profitable continuous employment of both capital and labor, is being made, and the result undoubtedly will be an increased understanding of the problems of each side.

Anthracite At the Cross-roads

THE doing of harm to an industry of national importance is a matter which cannot be taken lightly. The recent years have witnessed the inroads made upon the successful mining of anthracite coal by the flood of imports from foreign countries into New England and Canada, by the development of and crowding in of competitive fuels and by the failure of the railroads to recognize the protest so evident in the thousands of motor trucks which now bear a large percentage of anthracite production to market.

The attention of the public is now directed to the expiration of the wage agreement between the producers of anthracite and the employes of the mines. The agreement expires April 1, 1936. The joint wage conferences are scheduled to begin in February. Improved technique through the introduction of modern devices is one of the very definite means which can be employed in saving this industry and its employes from threatened engulfment and destruction.

The United Mine Workers of America for some years past are clearly on record as standing for and approving of the modernization of mining methods. It is sincerely to be hoped that early in the coming wage negotiations the representatives of the workmen in the anthracite industry will be consistent in maintaining a constructive attitude toward this recorded policy of the Mine Workers. In the writing of the joint wage agreement every encouragement should be offered for the introduction of modern devices and the improvement in technique for both underground and surface practice. Operators who have at great expense installed up-to-date cutting and loading machinery should not be denied the cost savings to which their enterprise entitles them.

It may be that ultimately, perhaps in the course of five to ten years, a lesser number of men must be employed in the production of anthracite for this nation. Certainly it must be realized that no additional men can be employed in the industry. If, however, the transition to improved methods is gradual, none of the men employed at the present time will be harmed, and through constructive and consistent observation of the proper principles of wage negotiations and of the economic facts which must be met, the industry may be saved and employment perpetuated under modernized and greatly improved conditions.

Problems of STABILIZATION*

By ROBERT E. TALLY†

THE term "stabilization" when applied to the mineral industries signifies nothing more than an adjustment of supply to demand. Its aim is to maintain normal inventories and to prevent violent fluctuations in the prices of its products.

Over-production, with excessive inventories forced on a market with insufficient demand, results in lower prices, and if continued will eventually demoralize the industry. Insufficient production, with subnormal inventories, results in inflated prices, which are even more damaging and which are primarily responsible for the over-development of industry.

It is frequently found that the most practical method of adjusting supply to demand is through the allocation of sales. Under this plan a reasonable amount of employment, staggered when advisable, may be provided, with provision for the sale of additional production in the foreign markets.

The major difficulties encountered in any stabilization plan are, first, the natural selfishness of human nature, and secondly, the anti-trust laws, or excessive governmental regulation.

There are two schools of thought insofar as stabilization is concerned, both of which deserve serious consideration. One school is opposed to it on the grounds of artificiality, impracticability, and governmental interference, while the other favors it on the basis that it provides reasonable stability of earnings, wages, employment, and prices to the consumer.

No plan will succeed unless subscribed to, and adhered to, by all members of an industry, and unless it is simple and sound and honestly administered. Further, it must be relatively fair to all participants as well as to labor and the consuming public. And last but not least, any such plan must have a minimum of governmental regulation.

Governmental cooperation without regulation is not to be expected until it can be shown that industry is competent to govern itself, not only for the benefit of its shareholders but in a manner that will not prove detrimental to the public interest.

The anti-trust laws are the result of abuses of public rights by industrial leaders of the past, but as usual in American legislation these laws, instead of being corrective and a check to further abuses, are so extreme that they have proved prejudicial and damaging to American business, labor, and the public.

The ideal for American business is, or should be, voluntary regulation or self-government, and it is quite probable that the membership of some industries is even now competent to proceed on this basis. However, the repeal, relaxation, or more liberal interpretation of the anti-trust laws, without some positive regulation, might result in such abuse of rights that further and more drastic legislation and regulation would follow. Nevertheless, the mineral industries should strive diligently toward self-regulation, endeavoring to educate and improve the ethics of its membership, and to provide ways and means for such regulation.

The world is composed of all kinds of people—good, bad, and indifferent. Likewise business, industry, finance, and government are made up of all classes, with varying degrees of selfishness, honesty, ability, and ambition. Some are broad, liberal, able, and honest, and believe in the theory that it is at times necessary to cooperate with competitors in order to help themselves, while others will resort to almost any means to gain an unfair advantage. This latter group is commonly referred to as "chiselers."

A large majority of the members of the mineral industries believe in the theory of regulating production to con-

* Presented at Metal Mining Convention, American Mining Congress, Chicago, Ill., Sept. 24, 1935.

† Prescott, Ariz.

sumption. Many of them, however, submit reasons why they should be exempt, or argue for special concessions, the cumulative effect of which, if granted, would render the plan useless. This may be termed trading for position or for the benefit of one's interests, and is not to be confused with the tactics of the so-called chiselers, unless these tactics are carried too far.

It is these chiselers that make it so difficult and at times impossible for an industry to reach a voluntary agreement, thus forcing either excessive governmental regulation or a struggle for the survival of the fittest.

American business men are not idealists. They are of necessity hard-headed and practical. Most of them are good traders, but faithful to an agreement when made, verbally or otherwise. There are some, however, whose standards and ethics are subject to criticism, and while in the minority this element nevertheless constitutes a serious menace to any cooperative plan.

The opponents of stabilization claim first that it is difficult to arrive at a fair capacity or quota basis for the different members of an industry, and that it is difficult to administer in accordance with this basis. This is not a vital or even a serious objection, for courage, honesty and fairness should solve this problem. The selfish ones, however, may not be satisfied. Their second and most serious claim is that the members of an industry cannot and will not voluntarily agree to and adhere to any reasonable plan, and that there are always a sufficient number of chiselers to prevent arrival at a satisfactory agreement. A third claim, also a serious one, is that the Government will not agree to cooperation without regulation, and that, while a reasonable amount of regulation is not necessarily objectionable, the Government is ambitious for and is directing its efforts toward the control of business.

It is unfortunately a fact that the members of an industry are as a rule unable to carry out a stabilization plan without the cooperation of the Government, a condition which is due largely to an unduly selfish minority within the industry. Likewise it is a fact that most industries would rather abandon their efforts toward stabilization, and proceed as in the past, than to submit to excessive governmental regulation, for it is only in the over-developed industries that stabilization is important or advisable.

Robt. E. Tally

It is claimed that the policy of the survival of the fittest is in accord with the natural law of economics, and is the only practical solution for an over-developed industry; that the public will benefit as a result of cut-throat competition; that the high cost producers will be eliminated and that foreign sources of supply or domestic substitutes will be developed to replace such assets when depleted. These arguments contain some sound logic, but it is nevertheless believed that a simple, effective and honest plan can be developed, and that such a plan will prove beneficial to the public interest as well as to shareholders and labor. No plan should have as an objective the continuation of high cost, non-economic units on a profitable basis, nor should any plan attempt to maintain low prices in order to discriminate against such units.

The policy of the survival of the fittest would be a simple and natural one to follow, if effective; but experiences of the past show it is only in the nature of temporary and costly disciplinary measures, and does not remove the cause nor remedy the effect. Why should industrial communities, labor, and shareholders suffer on account of selfishness on the part of a relatively few business outlaws, and why should overly-ambitious, theoretical, and unsound governmental policies be forced upon American business in return for a cooperative plan?

The Government is urged to cooperate with industry to the extent of not only permitting, but encouraging—and if requested by the authorized representatives of an industry, of demanding—reasonable trade agreements during periods of subnormal prices only, with an understanding in regard to wages, hours of employment, and the furnishing of an adequate supply of their products to the trade at reasonable prices.

The mineral industries are urged to develop sound and equitable stabilization plans, to appoint committees for the administration of these plans, and to submit the same to the Government for their information and approval if possible. They should also request that a representative of the Federal Trade Commission, or some other governmental agency, be asked to attend all meetings of the committees in a consulting capacity, and advise the committees with regard to the limitations of the submitted plans.

The Federal Government should appreciate the importance of an adequate supply of minerals and metals, not only for the maintenance of the nation's revenues and commercial position but also for purposes of national defense or war. Further, it should realize that the subnormal prices prevailing during the depression years have discouraged exploration for new sources of domestic supply. Practically no exploration work has been conducted during recent years, with the result that these resources are being liquidated. Industry has not been justified or able under recent prices to continue an exploration campaign, and this policy, if continued too long, will prove damaging in the extreme to the Government and the public interest, as well as to the mineral industries.

Both the Government and the members of these industries are urged to adopt policies in which common sense, courage, and honesty prevail, with a minimum of selfishness on the part of industry and of political ambition and untried theories on the part of the Government. Both groups should cooperate one with the other for the benefit of all, and the American Mining Congress is suggested as a medium for coordinated action on the part of the entire industry. The Guffey coal bill suggests the necessity for such action.

ASTOUNDING figures showing the extent of governmental spending—local, state, and national—were presented at a meeting of the National Business Conference Committee on October 31, participated in by leading industrialists and representatives of some 50 national organizations. The American Mining Congress was represented by President Howard I. Young and Secretary Julian D. Conover.

Total expenditures of local, state, and national governments in 1913 were approximately $4,000,000,000. In 1934 they had risen to the enormous figure of $15,000,000,000, equal to *one-third of the total national income from all sources.* The reduction of waste and unnecessary spending, so as to permit the cutting of taxes, were given earnest consideration by the conference, as being the most serious problem before the country today.

A proposed educational campaign was given whole-hearted endorsement by Mr. Young, president of the Mining Congress, and other industrial leaders, who urged that it be undertaken promptly.

Problems of

FEDERAL TAXATION*

By ELLSWORTH C. ALVORD‡

IT IS exceedingly easy to discuss problems of Federal taxation. It is exceedingly difficult to find or suggest solutions.

Consistent with the subject assigned to me I shall attempt merely to outline and analyze Federal tax problems now confronting you. Upon you rests the responsibility for their solution.

Federal Budget

The budget problem with the Federal Government is merely a balancing of total annual receipts against total annual expenditures. Everyone agrees—even those occupying official positions in Washington—that for a period of years the total of our receipts and of our expenditures must be brought into balance. It is also generally admitted that we must provide for a reasonable sinking fund to retire the debt accumulated through the past failures to balance the budget. I start with the assumption, therefore, that you will insist upon a balanced budget. We are in our sixth year of consecutive deficit. Therefore, I make a further assumption that you will insist upon a balanced budget within the very near future.

Everyone realizes, abstractly, that a balance of receipts and expenditures, including a reasonable sinking fund, may be attained by a decrease in expenditures, an increase in revenues, or both. You must decide. In reaching a decision you must determine upon the total annual expenditures you will authorize.

Federal Expenditures—Which Way Are We Going?

Historical facts are sometimes interesting and frequently helpful. Looking backward, and broadly speaking, Federal expenditures can be divided into three eras:

(1) From 1790 to the beginning of the Civil War. During this period the per capita annual revenue was about $2 and the expenditures of the government were kept at about that figure.

(2) From the close of the Civil War to the beginning of the World War, the per capita revenue was about $7 and the per capita expenditures were about the same.

(3) From the close of the World War to the recent past, the per capita revenues have beeen about $34 and the per capita expenditures were approximately the same.

In connection with the above figures, it is interesting to note that, in 1860, just prior to the Civil War period, the per capita public debt of the United States was only $2.03. In 1865, at the close of the Civil War, the per capita debt was $77.07. By 1916, the per capita debt had been brought down to $11.96. In 1919, at the close of the World War period, the per capita debt was $240.09, which by 1930 was reduced to $131.38. However, so-called "emergency expenditures" of the last few years have brought the per capita debt up to $226, as of June 30, 1935.

For the fiscal year ending June 30, 1914, just prior to the World War period, the revenues of the Federal Government amounted to $734,673,167, and the expenditures amounted to $735,081,431. Therefore, the budget was practically in balance at the close of that year. Moreover, at the same time, our gross public debt amounted to only $1,188,235,000. For the fiscal year 1919, revenues were $5,152,257,136 and expenditures were $18,522,894,705. The public debt on June 30, 1919, amounted to $25,482,034,000.

Before the World War, the Federal Government was operated on about three-fourths of a billion dollars. Since that war, the minimum expenditure by the Government in any fiscal year has been over $3,390,000,000.

Let us now consider the fiscal year just closed on June 30, 1935. For that year, revenues amounted to $4,185,957,749 and expenditures amounted to $7,654,807,458, leaving a deficit of $3,484,568,580. Thus, per capita revenue was $32.70 while per capita expenditure was $60.18, or, in other words, the Government was spending $1.83 for every dollar it takes in.

I am giving you a table showing our per capita revenues and expenditures, and a table showing our total receipts and expenditures, with the resulting surplus or deficit, from 1800 to the present fiscal year. I am confident they will help you decide the problem I have presented to you: Which way are we headed?

Per Capita Federal Revenues and Per Capita Federal Expenditures

	Per capita revenues	Per capita expenditures
1800	$2.04	$2.03
1820	1.75	1.89
1840	1.14	1.42
1860	1.78	2.01
1865	9.53	37.07
1870	10.66	8.03
1880	6.65	5.34
1890	6.40	5.05
1900	7.46	6.85
1910	7.34	7.54
1914	7.50	7.51
1917	11.00	19.35
1918	35.38	122.58
1919	49.07	176.40
1920	62.83	60.84
1922	37.40	34.54
1924	35.44	30.98
1926	34.01	30.76
1928	33.73	30.40
1929	33.19	31.67
1930	33.91	32.42
1931	26.73	34.01
1932	17.00	42.25
1933	17.81	42.22
1934	25.92	57.29
1935	32.78	60.18
1936	32.70	68.48

Let me review briefly:

During the first era, our per capita expenditures were about $2.00.

During the second, our per capita expenditures were about $7.00.

During the third, our per capita expenditures were about $34.00.

* Presented, Annual Metal Mining Convention, Western Division, The American Mining Congress, Chicago, Ill., September 26, 1935.

‡ Attorney at Law.

Where are we now?

In 1932 and 1933, our per capita expenditures were about $42.00. In 1934, $57.00; in 1935, about $60.00; and in 1936, they will be about $68.00.

Have we entered a fourth era? Must we provide for expenditures more than twice our average annual per capita expenditures from 1922 to 1932?

Leaving out of account trust fund expenditures and miscellaneous items, the 1935 expenditures of the Government amounted to $7,375,825,166. According to the bookkeeping system now in use by the Treasury, this sum is divided into two parts, consisting of general expenditures of $3,721,234,635 and emergency expenditures of $3,654,590,531. I shall not discuss the wisdom or the propriety of the classification. Nor shall I ask whether ordinary items have been transferred and concealed in the emergency budget.

General expenditures will be with us always. As a practical matter, many of the so-called "emergency expenditures" will probably be with us for years. Federal expenditures for 1936 were estimated at $8,765,381,088 in the annual budget message last January. Actual appropriations I believe are in excess of the budget statement.

Unless you compel drastic action, I estimate conservatively that the average budget for the next ten years will amount to $6,500,000,000, including reasonable sinking fund payments for the retirement of the existing public debt. This places our expenditures at about $51.00 per capita instead of $32.70 per capita as at present.

Bear in mind, that I am not giving you a budget of expenditures for 1937, or for that matter for 1938. I am merely projecting an annual average budget, conservatively estimated, for a period of ten years beginning after more than $2,200,000,000 have been eliminated from our 1936 budget.

We have heard it said, particularly by those responsible for the present spending spree, that our federal budget will be balanced readily upon a return of normal business activity. Let me blink at the innumerable barriers seemingly placed in the roads of recovery. Let me assume that the so-called "breathing spell" is converted from a period during which "Death takes a Holiday" to a period of greater permanency; and that during this period, aided perchance by less future shackling if not by a removal of existing shackles, there will be a return of normal business activity. Notwithstanding the predictions of a readily balanced budget, we have been given no supporting estimates of either expenditures or revenues.

I have stated that my best conservative estimate is $6,500,000,000—unless very drastic action is taken. I give you this estimate merely for the purpose of presenting to you the problem: What should our average normal expenditures be during the period I have suggested?

TABLE I

Fiscal year	Ordinary total receipts	Total ordinary Expenditures	Surplus	Deficit
1800	$10,848,749	$10,786,075	$62,674	
1814	11,181,625	34,720,926		$23,539,301
1820	17,880,670	18,260,627		379,957
1830	24,844,116		9,701,050	
1840	19,480,115	24,317,579		4,837,464
1847	26,495,769	57,281,412		30,785,643
1850	43,603,439	39,543,492	4,059,947	
1860	56,064,608	63,130,598		7,065,990
1863	112,697,291	714,740,725		602,043,434
1865	333,714,605	1,297,555,224		963,840,619
1870	411,255,477	309,653,561	101,601,916	
1880	333,526,611	267,612,958	65,883,653	
1890	403,080,984	318,040,711	85,040,273	
1899	515,960,621	605,072,179		89,111,558
1900	567,240,852	520,860,847	46,380,005	
1910	675,511,715	693,617,065		18,105,350
1914	734,673,167	735,081,431		408,264
1917	1,124,324,795	1,977,681,751		853,356,956
1918	3,664,582,865	12,697,836,705		9,033,253,840
1919	5,152,257,136	18,522,894,705		13,370,637,569
1920	6,694,565,389	6,482,090,191	212,475,198	
1922	4,109,104,151	3,795,302,500	313,801,651	
1924	4,012,044,702	3,506,677,715	505,366,987	
1926	3,962,755,690	3,584,987,874	377,767,816	
1928	4,042,348,156	3,643,519,875	398,828,281	
1929	4,033,250,225	3,848,463,190	184,787,035	
1930	4,177,941,702	3,994,152,487	183,789,215	
1931	3,317,233,494	4,219,950,339		902,716,845
1932	2,121,228,006	5,274,325,513		3,153,097,507
1933	2,238,356,180	5,306,625,054		3,068,266,874
1934	3,277,733,940	7,243,725,625		3,965,991,685
1935	4,170,238,878	7,654,807,458		3,484,568,580
1936*	4,185,957,749	8,765,381,088		4,579,423,339

*Estimated.

TABLE II

Income and surtax tax on individuals and partnerships	$1,464,000,000
Income and excess-profits tax on corporations	2,493,000,000
Estate taxes	103,000,000
Liquor, beer and wine taxes	137,000,000
Tobacco taxes	295,000,000
Sales tax on tangible articles (autos, jewelry, etc.)	355,000,000
Sales tax on intangibles (stocks, bonds, admissions, transportation, etc.)	447,000,000
Occupational taxes	17,000,000
Capital stock tax	93,000,000
Miscellaneous tax revenue	4,000,000
Total tax revenue	$5,408,000,000
Customs	323,000,000
Miscellaneous receipts	964,000,000
Grand total revenue	$6,695,000,000

Federal Revenues

Before you can determine upon a proper annual expenditure, you must consider revenue possibilities. What taxes will be required to produce $6,500,000,000 annually? How can we increase our revenues from $32.70 per capita, as at present, to about $51 per capita?

Of course, increased business profits will bring in substantial added revenues under our existing law. The income tax yield is necessarily dependent on business profits. However, it is doubtful if our present system of taxation, even with substantially increased business, would return more than $5,000,000,000 anually, or approximately $39 per capita. And certainly I would not recommend a continuance of the inequities and absurdities of the present law—which, for present purposes only, I shall disregard. Can we increase our tax burden by 33 per cent without crushing business and without seriously interfering with the revenues of our States and local subdivisions?

Only two methods occur to me:

(1) Increased income taxes on the little fellow as is the British system, and

(2) Impose a general sales tax.

In the fiscal year 1920, our receipts were $6,694,565,389. This exceptional amount came from taxes imposed at very high rates during a period of high prices and enormous war profits, during the calendar years 1918 and 1919. You will recall that the last two installments

of income tax for 1918 and the first two installments of income tax for 1919 were paid in the fiscal year 1920.

Where did the revenue come from in 1920 and what tax rates produced this income? Briefly summarized the sources of revenue were as shown in Table II.

Four billion one hundred and fifty-three million dollars of the above mentioned total revenue, or about 62 per cent, were derived from income taxes, the estate tax, and the capital stock tax.

What rates were in force to produce this revenue? The normal income tax rate on individuals for 1918 was 12%, for 1919 it was 8%. The surtax rates in both years were graduated to a maximum of 65% on net incomes in excess of $1,000,000. The normal rate on corporations in 1918 was 12%, and in 1919 10%; but there was an excess profits tax in 1918 graduated to 65% and in 1919 to 40%. In addition, during the year 1918, there was a war-profits tax of 80%.

The estate tax was graduated to 25%, and the capital stock tax rate was $1.00 per $1,000. The tax on cigarettes was the same as today, 6 cents on an ordinary package of 20 cigarettes.

There were taxes on practically all of the articles taxed today and, in addition, there were taxes on soft drinks, candy, slot machines, hunting garments, art objects, carpets and rugs, picture frames, trunks and valises, fans, men's waistcoats, men's and women's hats, and on many other articles. Then there were taxes on railroad and steamship tickets, on pullman tickets, on freight bills and other items of transportation. The rates of these taxes were relatively high.

Unquestionably, this heavy system of taxation, if reenacted today, would be wholly inadequate to produce the revenues it did under the conditions of 1918 and we have already increased our taxes on the wealthy beyond the burden imposed in 1920—but such increases have been and will be productive of little revenue. Surtaxes on individuals now go as high as 75%. Estate taxes are graduated to 70%.

I repeat: Even the severe rates of the 1918 Act will be inadequate. Substantially adequate revenues will be obtained only (1) by broadening the base of the income tax in line with the British system, and (2) by a general sales tax of some form.

What is the British income tax system? It imposes a 22½% tax on corporate incomes as compared with our present rates of 12½% to 15%. Second, it places a normal tax of 22½% on the net income of individuals, except that on the first $675 of income only ⅓ the standard rate is paid. The personal exemption for a married person is only $875 instead of $2,500 as in the United States, while the exemption for a single person is $500 as compared with $1,000 in the United States.

Perhaps the best way to compare the British system with the Federal system is to show the taxes which would be paid in Great Britain and in the United States on specimen net incomes of various amounts, assuming a married man with no dependents and a maximum amount of earned income:

Income Tax Payable Great Britain and United States Compared (British pound taken at $5.00)

Net Income	Great Britain	United States
$1,500	$26.25	$0
2,000	67.50	0
2,500	157.50	0
3,000	247.50	8
4,000	427.50	44
5,000	607.50	80
7,000	967.50	172
10,000	1,620.00	415
14,000	2,760.63	809
20,000	4,729.38	1,589
25,000	6,679.38	2,489
30,000	8,766.88	3,569
50,000	18,216.88	8,869
70,000	28,766.88	16,449
100,000	45,279.38	32,469
1,000,000	613,529.38	679,044

It will be noted from the figures just given that, while a man with a net income of $1,000,000 or more pays considerably more tax in the United States than in Great Britain, a man with a smaller net income pays a very much greater tax in Great Britain. In this country a married man with a net income of $2,500 pays no tax, in Great Britain he pays $157.50, or a tax equivalent to more than 6% on his entire net income. A married man with a net income of $4,000 in the United States pays a tax of $44, in Great Britain he pays $427.50, or nearly 10 times the Federal tax.

The secret of the productivity of the British income tax is its broad base, which makes practically every one steadily employed pay a tax.

The receipts from the British income and surtax for the fiscal year ending March 31, 1935, amounted to $1,400,000,000. The Federal income and surtax receipts for the fiscal year ending June 30, 1935, amounted to $1,099,000,000. In other words, British income tax revenues exceeded Federal income tax revenues by more than 27%, in spite of the fact that the population and wealth of the United States are about 2½ times the population and wealth of Great Britain. It may be conservatively estimated that we could double our income tax receipts by adopting the British system. We could increase our national revenue $1,000,000,000 by this method. The question I present is: Do you want to do so?

You are all familiar with proposed sales taxes. Various forms of sales tax are already in force in many of the States. We also have as models the manufacturers' sales tax of Canada and the turnover tax of France. It would not be difficult to design a sales tax which would bring in from one-half to three-quarters of a billion dollars annually.

Thus, if you accept my estimated average budget of $6,500,000,000 (which, I remind you, is based upon improved business conditions), our present system of taxation, permitting of no reforms, would produce $5,000,000,000; and the addition of the British system of income tax and a sales tax would produce the $1,500,000,000 necessary to balance a $6,500,000,000 budget.

In the fiscal year 1928, the total expenditures of the Federal Government were $3,643,500,000 in round figures. What was this money spent for?

In 1935, the general expenditures of the Government amounted to $3,721,200,000 in round figures, leaving out of account trust fund expenditures, and of that emergency expenditures amounted to about $3,654,600,000. The regular or general expenditures of the Government were somewhat greater than the total expenditures in 1928 of $3,643,500,000 just accounted for.

What were the expenditures listed in the fiscal year 1935 as emergency ex-

(*Concluded on page* 39)

TABLE III

General Government (Departmental, etc.)	$550,900,000
Protection to persons and property:	
Army, Navy and War activities	709,700,000
Department of Labor	9,800,000
Prohibition Enforcement	13,500,000
Regulation of corporations, industries, etc.	10,400,000
War Claims	52,900,000
Conservation of natural resources	73,500,000
Conservation of Health and Sanitation	16,300,000
Highways, etc:	
Highways	90,900,000
Waterways, river, bridges, etc.	92,100,000
Charities, Hospitals, Prisons, etc	47,400,000
Education	13,800,000
Parks, Monuments and Cemeteries	9,300,000
Interest on Public Debt	731,800,000
Debt Retirement	540,300,000
Pensions	412,200,000
Military, naval and veterans' insurance	117,500,000
Adjusted Service Certificates	111,800,000
Indian Affairs	38,700,000
Special relief and loans to agriculture	700,000
Total	$3,643,500,000

Government Spending of the Taxpayer's Money*

By LEWIS W. DOUGLAS†

I AM DELIGHTED to be here, among those who are engaged in underground work for the purpose of producing something useful. I am equally glad to have severed my relationships with those who are engaged in underground work for the purpose of destroying our American system.

The subject of the New Deal is such a large one, there are so many phases of it which might be discussed to advantage, there are even so many phases of this question of public spending that might be discussed to advantage, that I feel a certain amount of difficulty in knowing exactly how to approach it. It is very much like a crystal, with each face bearing a definite relationship to every other, with each molecule having a definite mathematical ratio to every other. I suppose the best way I can do it is to approach it in somewhat the same fashion that I have approached it before.

I am not going to discuss, this afternoon, the efforts to cure the evils of inflation, where we had an inflation, with more of the same thing. I am not going to discuss the efforts to cure the evils of excessive debt by incurring more debt. I am not going to discuss the efforts to cure the evils of high tariffs by raising them, through devaluing the currency. I am not going to discuss the complete picture of Socialism, which the various acts of the New Deal go to paint, of the perfect design which each one makes when fitted into each other one, except to say that in the field of monetary and fiscal policy it parallels absolutely what was done in Soviet Russia after the fall of the Kerensky regime, where first they confiscated gold, then socialized banking deposits and finally spent the currency into destruction.

But I am going to speak of this spending policy. I am amazed, sometimes, at the extent to which human minds lose their sense of proportion and become accommodating, temporarily at least, to things which are essentially bad. This matter of spending policy brings that amazement home to me, just as the period from '27 and '28 to '29 created the same amazement. You may recall that in 1927 there were a great many people throughout the country who held that the stock market was too high. You may recollect that by 1928 there had been a substantial number of desertions from that army of believers. And you probably will recall that by 1929, almost everybody had become convinced that the new era had really dawned. Unfortunately for them, they became convinced just a few months too early.

So it was with spending. In 1931, we experienced a deficit of more than $900,000,000 (and may I here interpolate that I am giving these deficits with sinking fund included), and there was considerable apprehension about it. I recollect that in Congress in the spring of 1932, many months were consumed in devising ways and means of bringing the budget into balance, because the Congress was then thoroughly aware of the inherent dangers in an unbalanced budget.

During the fiscal year 1932, we experienced a deficit of over three billions of dollars, and yet there was not quite so much apprehension then as there was in the previous year. In 1933, we experienced another deficit, of more than three billion dollars, and yet it was only a few weeks later that we embarked gleefully upon a policy of great spending. In 1934 we experienced a deficit of almost four billion dollars, and yet there seemed to be almost no apprehension at all. And during the fiscal year 1935, just closed, we incurred a deficit of more than three and a half billions, and now we are told blithefully and with a smile that the deficit for the fiscal year 1936, ending next June, will exceed four and a half billion dollars.

I sometimes wonder whether anyone living comprehends what a billion dollars is. I must confess to my own inability to appreciate what it amounts to. The only way I have been able to envision what a billion dollars is, is to try to think of the years of toil and effort by many hundreds of thousands of individuals which must go to produce a billion dollars' worth of goods and services.

It is not a small sum of money, and it takes almost indefinable effort to produce goods and services which command a billion dollars in the market.

And yet we have already, during five years, incurred an accumulated deficit of more than fourteen billions of dollars, and during six years, according to budget estimates, and the statement of the President, our accumulated deficit will approach twenty billions of dollars.

These are stupendous sums, when one stops to think of them, but that is not all. These deficits, with the exception of the one incurred in the fiscal year 1931, are in relation to income greater than any deficit which has been incurred by any government since the collapse of Russia and the Russian currency in 1921. There is no modern government today which is incurring a deficit as large as ours, in relation to its income. For four successive years, our deficits have been greater than 100 percent of our income, and for the fifth year it will be more

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* Presented at Metal Mining Convention, American Mining Congress, Chicago, Sept. 25, 1935.

† Vice president, American Cyanamid Company, New York City, N. Y.

The United States Treasury at Washington

than 125 percent of our income. The size of these deficits alone is enough to create apprehension. But there is another feature of them that is worth discussing.

It is interesting to note that Reconstruction Finance Corporation expenditures, which in part are returnable or repayable, accounted for a very large part of the deficit during the fiscal years '32, '33, and '34. And it is interesting further to note that during the fiscal year 1935 just closed, the Reconstruction Finance Corporation expenditures amounted to but 15 percent of the total three and a half billion dollar deficit incurred. And it is further interesting to note that of the four and a half billion dollar deficit prognosticated for the present fiscal year, not one single solitary cent will be accounted for by Reconstruction Finance Corporation expenditures.

To state the case one way, one can say that while the deficits have been rising, despite an alleged recovery, a semblance of recovery, the expenditures which go to make up the deficit and which are returnable have been diminishing. Or the case can be stated another way. Reconstruction Finance Corporation expenditures do not necessarily create vested interests. But the type of expenditure incurred for public works and relief do create vested interests. For what is first taken as charity is subsequently demanded as a right, and we have had much experience of that in our history. So another way of stating the case is to say that while the deficits have been rising, that portion of them incurred by expenditures which do not incur vested interests have been decreasing, while that portion of them which have been incurred and which do incur or create vested interests have been increasing.

But there is another aspect of these deficits which should command attention. The amount expended for relief and public works has increased more than 600 percent between the fiscal years 1932 and 1935, and almost 800 percent between 1932 and the fiscal year 1936. And this despite those who would attempt to defend the spending policy on the ground that as we have recovery, relief and public works expenditures will be diminished. We have had something of a recovery, and yet relief and public works expenditures have been constantly increasing.

More than that, the expenditures on public works have been continued, despite past experience with them. There is nothing new about public works. President Hoover tried them during the fiscal year 1933. He expended almost $500,000,000. And the total amount of employment, direct and indirect, which was granted was less than 300,000 men. In spite of that experience, confirmed by Great Britain's, France's, and every other country's which under a profit system has attempted public works as a method for relieving unemployment. the present administration continued in the same path, and as the result of an expenditure of two and a half billions for a period of three years on public works, the total employment, direct and indirect, will not exceed 700,000 men.

There is another aspect of this spending policy which deserves attention, and that is the matter of relief. I do not know how to explain what I am going to say. I will merely give you the facts. There are approximately 20,000,000 people on relief. Of that number, 8,000,000 are in agricultural and rural communities, where the unemployment problem is the least; and 4,000,000, out of a total negro population of approximately 11,000,000, are negroes. I do not know how to explain those figures. The only explanation that I can make is that the figures themselves evidence an irresponsible administration of public monies for the purpose of preventing starvation.

When one puts all of these different factors together, one must conclude (there is no other conclusion that a person can reach) that the administration in power in Washington is an irresponsible spending government, and that its spending is being undertaken by those who have no knowledge of how wealth is produced and who perhaps care less.

I have not mentioned here another important item which has been overlooked, and that is the item of contingent liabilities. I venture the statement that no living man knows what the contingent liabilities of the Federal Government are. They at least exceed six billions of dollars. How much more than that they amount to, no one can tell. Given an-

other deflation, as there must be whether we suffer from a credit inflation or a currency inflation, those contingent liabilities guaranteed by the Federal Government must become direct liabilities, at the very time when the Federal Government has no credit with which to pay them.

The magnitude of these accumulated deficits is enough to create real fear as to the security of our Government and of our people. I say that because at all times, under all circumstances, under all suns and under all moons, in all climates and under all geographical circumstances, wherever governments have continuously spent more than they have taken in, they have destroyed either in whole or in part their currency. And there is not one single solitary exception throughout the history of mankind.

Whenever governments have attempted it, the defenders of the experiment have always claimed that conditions were different, just as they now claim that conditions are different. But whatever the claims of the defenders have been, without exception, wherever history records excessive spending on the part of governments, one finds either a wholly or a partially destroyed currency.

The social significance of a destroyed currency is great. A destroyed currency, even a partially destroyed currency, inflicts intense pain and suffering, great poverty, not on the speculator and the very wealthy, for they may have the intelligence to hedge and to escape, but on the great middle class, on the laborer, the competent laborer, on the widow, and the person who is drawing some sort of a pension. They are the ones who are crucified on the cross of a destroyed currency.

And almost all destroyed currencies have arisen out of government deficits. It was government deficits that compelled the devaluation of the denary, in the Roman history. It was government deficits that destroyed the franc in France, during the days of that father of the Mississippi Bubble, John Law. It was government deficits that destroyed the franc again, during the early days of the French Revolution. It was government deficits that destroyed the German mark during the post-war period of extravagance. It was government deficits that destroyed 80 percent of the French franc during the post-war period. It was government deficits that destroyed 80 percent of the lira in Italy, during the post-war period. It was government deficits that destroyed the pfenig in Austria, during the post-war period. It was government deficits that destroyed the dollar during the War of Independence, and inflicted more pain and suffering, did more damage to our citizens, than the combined forces of Great Britain and the Hessians. It was government deficits that destroyed in part the dollar during the Civil War, and it was government deficits that laid the foundation for the post-war inflation, which had a very profound effect upon the great majority of our people when that inflation came to an end. I will defy any living man or woman to point out one single solitary instance in history in which constantly recurring government deficits have not resulted in intense poverty, unemployment, and even at times the destruction of a whole population.

That is what experience teaches. But there is a reason for it. In government there are vested two powers, that is in federal governments. The first is the power to appropriate and to expend public money, and the second is the power to manufacture money. And whenever governments, through deficits, reach the point where they can no longer borrow, they resort to their second power, the power to manufacture money. It is the exercise of that power which destroys the currency and destroys a people.

This has been done throughout history in many different ways. It was first done by clipping coins, by devaluing them. Then governments resorted to the manufacture of paper. During more modern times they have issued their obligations to central banks, and the central banks have printed the money. But whatever the expedient has been, and in whatever form the experiment was undertaken, however disguised and concealed the method, the effect has always been the same. Now we have concocted a modification of the most recent of these methods. Doubtless at some other time in history some fourth-class college professor has been able to think of the same ingenious device, but at any rate, we are now employing it. It is the device of compelling commercial banks to take obligations, first, by creating conditions under which ordinary commercial enterprises do not seek bank credit, by instilling the man who is engaged in productive enterprise with fear, the fear that inhibits him from asking of the bank credit. Secondly, by intimidating the banks through the various methods which the administration now has within its control, such, for example, as the Reconstruction Finance Corporation; such, for example, as threats as made by the Governor of the Federal Reserve Bank himself in the hearing before the House Committee on Banking and Currency, to take over all the commercial banks of the country. By such methods, the administration has compelled the banking system to take its obligations. It has not sold its obligations to the public. Savings have not absorbed the obligations which have been issued to finance these huge deficits. The method employed has been just as inflationary in the long run as though money had been issued in the first instance. For in most instances, what has been done is that the Federal Government has taken its obligation to a commercial bank and received upon the books of that bank a credit against which the Government has drawn its check which has circulated around in the payment of its obligations, its debts, its current expenditures, and has come back into another bank or the same bank to build up bank deposits.

If you have any doubt that this is exactly what has happened, examine carefully the growth of bank deposits and compare the growth of bank deposits with the acquisition by the banks of governments. Approximately 80 percent of the obligations issued by the Federal Government to finance its deficits have gone into the hands of the commercial banks.

The first three of these four methods which governments employ, whenever they reach the point at which they can no longer borrow, brings about an immediate currency inflation, and the effect is almost always instantaneous. The process of impoverishing a people commences almost immediately, at first slowly, with gathering momentum as the years go on. The fourth is more insidious, the method which we are now employing. It lays the basis for a credit inflation, which ultimately may pass on into a currency inflation. But even if it never reaches that stage, it is inevitably followed by an intense deflation, a forced liquidation of the debts incurred during the inflation, a falling price level, and in this instance, because the banks hold $14,000,000,000 of the Government debt, a broken banking system. Because with the deflation, Government obligations must depreciate, and a 15 percent depreciation in the value of Government obligations will make almost 80 percent of the banking institutions in the United States bankrupt. And at the same time there will be no Government credit with which these unemployed can be given subsistence.

I repeat what I have said on previous occasions. The social and economic consequences of such a catastrophe must compel profound social and economic changes within our country, and may, and probably will, compel the establishment of a dictatorship. For if a dictatorship was necessary in the spring of 1933 (and I call your attention to the fact that in effect it was created by the delegation of all congressional power to the executive branch), how much more necessary will it be in a crisis like this, arising out of the present fiscal policy, which confronts us? The situation is no better. If we have a currency inflation it will be followed by the same depreciation of government and exactly the same social and economic changes.

This is not theory. This is experience. It was because of the destruction of the currency and the inflation and the deflation in France in 1789, that the French Revolution went to the extremes which it did, that blood flowed in the streets of Paris, and the guillotine was established. In Russia, it has been frankly admitted by a member of the Soviet Government in a book dedicated to the Commissaire of Finance, written by Kovansky, that government's spending and the consequent destruction of the ruble was a more effective instrument, a more effective weapon in establishing the Soviet regime securely in Russia, than all the machine guns, all the concentration camps and all the gas bombs that were used. And he goes on to confirm what I have just said about the Revolution in France. I doubt that it can be successfully denied that Hitler in Germany would today be an impossibility had not the middle class been destroyed by the post-war Germanic inflation.

Lenin once said, "Give me the power to spend the currency into destruction, and I will determine what sort of a social and economic system will be established." In the University of Moscow it is expressly taught that one of the great obstacles to the establishment of the communistic regime throughout the world is American savings, and that the most effective way of removing that obstacle is for the Federal Government within the United States to continue to spend and spend and spend. In other words, to continue to do what the present administration has done.

No government can destroy its currency without inflicting such pain, such suffering, such poverty upon its people, that profound social and economic changes follow in its wake.

Don't be beguiled into the belief that we are immune from any such catastrophe. Other countries in history have been relatively as rich as we are. Other countries which have pursued the same course, and yet the end has been the same. There are some, however, who say that we are too wealthy, that our per capita tax is but a fraction of the per capita tax in Great Britain. The facts are that our per capita tax in the United States is $79, while in Great Britain it is $91. Then there are others who say that our per capita debt is so much less in this country, that we can stand the same per capita debt that they have in Great Britain, assuming that the vested interests created by spending can easily be divested. Is there any experience to confirm that assumption? But quite irrespective of that, let's look at the facts.

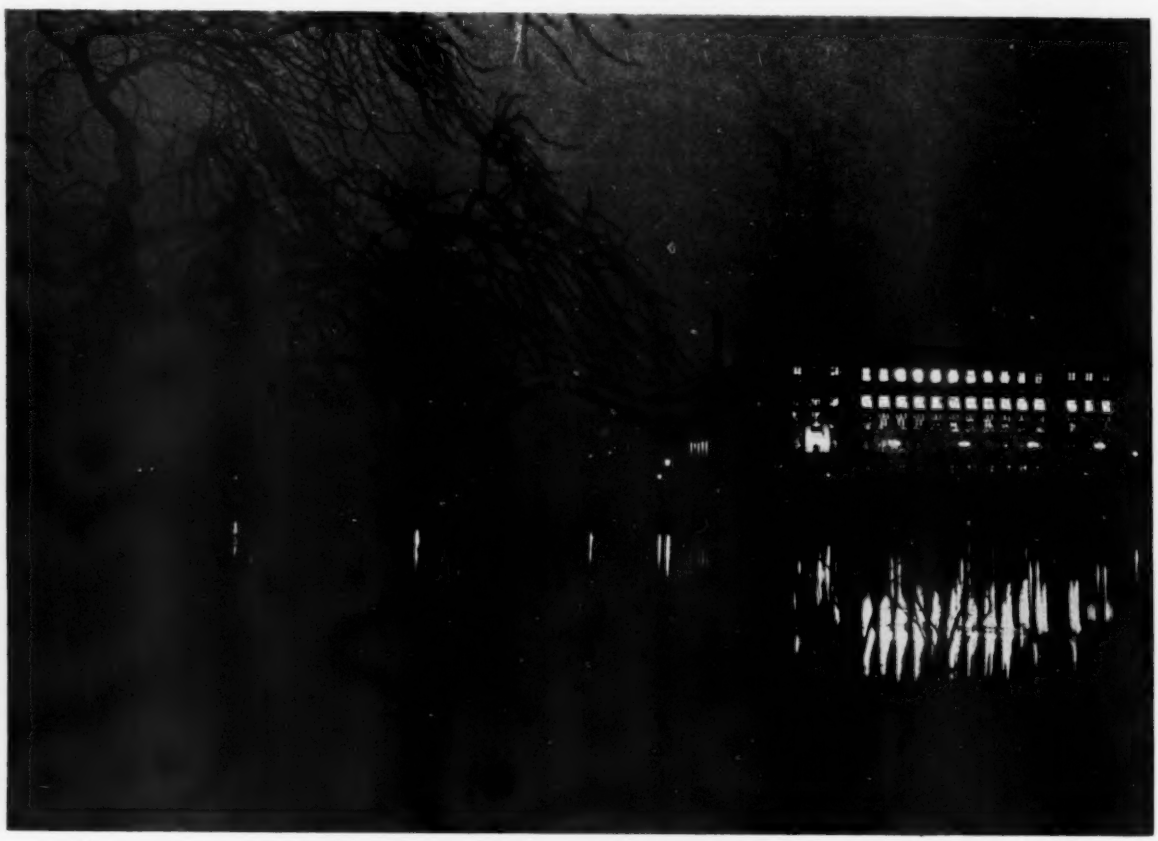
In 1862, we were compelled to issue greenbacks, to finance the Civil War. The circumstances here are quite different from the circumstances in Great Britain. They have as many taxpayers, federal income taxpayers, as they have beneficiaries of government spending, almost twice as many. Here we have about one-fifth as many federal income taxpayers as there are beneficiaries of government spending. And there are others who say that our gold stocks are a great protection. They would be, if they were put to use, but are they being put to use? Is there any man in this audience who can go to the treasury of the United States and demand payment in gold? Is there any man here who can hold in his possession gold? We are on a completely irredeemable paper basis, even to the extent of denying to American citizens the right to sue the Government in the Court of Claims for any damages accruing to them as the result of the repudiation of the gold clause contract. Can you imagine a country being on a more irredeemable paper basis than the one we are now on? Of what use is the gold? At some future time, when some man, whose courage will be tested to the very utmost, attempts to pick up the chips that have been scattered all over the backyard by this administration, that gold will be of value, but to prevent a calamity as long as it is not being put to use, it is of no service whatsoever. It might just as well be zinc or cowhides or shoes or any other imperishable object.

There are others who say, "Well, we spend to win a war; why not spend to win a depression?" It makes no difference for what purpose the Government spends. It is the act of spending that destroys the currency, whether it be for the purpose of waging a war or whether it be for the purpose of curing a depression. It is the spending which ultimately destroys a currency. Then there are others who say, "Ah! But we have a double budget, and one budget is in balance." That is a creation of romantic minds, a fiction of those who refuse to face reality. What difference does it make whether one budget is in balance and the other one is not? The spending goes on, notwithstanding, and it is the spending which destroys the currency.

Then there are others who say, "Given a recovery, the expenditures will diminish." In 1920, we collected the greatest amount of revenue we ever collected, and the exemptions were lower and the normal rates higher, and taxes were piled upon taxes, when we were enjoying full industrial production, with no unemployment, and the revenue amounted to $6,600,000,000. The present administration blithely, almost jovially, contemplates an expenditure of $8,500,000.

Is there any evidence to indicate that expenditures will fall with recovery?

(*Cconcluded on page* 33)



The United States Bureau of Engraving and Printing

INDUSTRY and the SOCIAL SECURITY Program*

By H. C. JACKSON†

IN A SKETCHY way an attempt will be made to give a short summary of the most important provisions of the Social Security Act, a few facts concerning its administration, and some observations on the probable effects on industry and the general public.

The act contains 11 titles, of which 5 relate to grants to states for old-age assistance, aid to dependent children, maternal and child welfare, aid to the blind, and public health work. The appropriations by the Federal Government for these state aids are limited to ninety-five and a half million dollars during the first year, but are limited only by the needs of the states in so far as old-age assistance and child welfare are concerned during succeeding years. It is estimated that these grants will reach somewhere between $750,000,000 and $1,000,000,000 per year by 1980, all of which must come from general taxation. The appropriations for grants to the states by the Federal Government for old-age assistance are designed to assist the states in carrying out their pension laws and to make Federal assistance available to care for the aged and needy persons who are out of employment or who will reach the age of 65 before ample retirement benefits elsewhere provided in the law are available.

The balance of the Social Security Act deals with the more important features relating to the old-age pensions for employed individuals and unemployment compensation, together with the levies to make these possible, and I will confine my remarks to these two principal subjects.

We all expect to be old some day, so we will personally be interested in the old-age benefits payable by the Federal Government under this act. Generally speaking, in order to receive these benefits an individual must be at least 65 years of age and have received total wages with respect to employment after December 31, 1936, and before settlement of not less than $2,000, the benefits to begin on the date he attains the age of 65, or on January 1, 1942, whichever is later, but in no event does he receive any benefits while he is gainfully employed. In other words, in order to receive the benefits it is necessary for a qualified individual to cease work. However, if these benefits are not paid during the life of a qualified individual, the Government will pay to his estate an amount equal to 3½ percent of the total wages which the deceased party has earned subsequent to December 31, 1936, but limiting such wages for the purpose of the computation to a maximum of $3,000 in any year. If an individual is employed in agricultural labor, domestic service, crew of a vessel, or is in the employ of a charitable institution or of the United States Government, or of a political subdivision, he is not subject to the old-age benefit provisions of the act, or to the levies imposed therefor.

In order to support the old-age benefits provided by the act, taxes on gross pay roll, except on amounts in excess of $3,000 to any one individual in any year, are levied, starting in the year 1937. These taxes are at the rate of 2 percent of such pay roll for the year 1937, and increase to 6 percent in the year 1949. One-half of these taxes is paid by the employer and the other half is paid by the employe having this amount deducted from his income by the employer, who in turn pays it to the Government.

It is probable that there will be some 40,000,000 employed individuals who will eventually be affected by the old-age security provisions of this act. The amount which any person will receive monthly after the age of 65 depends on his earnings per year and the number of years he has been employed since December 31, 1936. The maximum amount which anyone can receive is $85 per month retirement benefit. In order to receive this benefit an individual must have been employed 45 years and have received a level monthly wage of not less than $250. To give a general idea of the monthly annuity payable under the act, the following examples are quoted:

After 10 years of employment at a monthly wage of $100, an individual would be entitled to $22.50 per month annuity, and at a level wage of $250 a month for 10 years he would be entitled to $37.50 per month annuity; for 20 years at $100 a month wage the annuity would be $32.50, and at $250 a month $56.25; and for 30 years at $100 a month wage the annuity benefit would be $42.50 per month, and for $250 a month wage $68.75 per month. All of these annuities, of course, are payable at age 65 and provided the individual ceases employment at that age. If he dies before reaching the age of 65 and has been employed in

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† Pickands, Mather & Co.

any occupation not excepted by the law, his estate receives 3½ percent of his total earned wages, considering a maximum of $3,000 per year as the wage on which the benefits are computed, or if he dies before receiving benefit payments aggregating 3½ percent of his earned wages, his estate receives the balance.

The Social Security Act, and in particular the old-age benefit feature, is the combined product of a realization by the more farsighted industrialists and the New Deal social activity of the fact that it is not entirely fair for industry to use the best years of a man's life and then, at the time when he needs his employment most, to say "so long" to him and expect his friends, relatives, the community or the state to take care of him and his family in some makeshift manner. If the span of useful years of a man's life, as far as industry is concerned, terminates at or around the age 65, and if generally speaking industry cannot afford to pay the man more than sufficient for him and his family to live in reasonable comfort, leaving no margin for him to save for his old-age security, then in all fairness it is necessary that industry make some provision to take care of this person when he has passed his usefulness. Separate corporations cannot successfully underwrite a program to accomplish this on account of the large increase in their cost of operation which would be entailed and which would put them at an unfair advantage in their competition with other firms in the same line of business. Here and there exceptionally large corporations, recognizing the fairness of guaranteeing old-age security to their employes, have instituted pension plans. However, at the present time such plans do not reach more than 5 percent of the employed individuals in this country. By the way, it is unfortunate that in the present act no reduction in tax liability is given to the corporations who have these pension plans in effect. However, it is expected that proper modification to take care of this feature will be made at the next session of Congress.

Digressing a moment from discussion of the old-age benefit feature, and before considering the probable general political and economic effects of this act, let us explain briefly the unemployment compensation provisions. Under the present act, no compensation will be paid by the Federal Government, but the act sets up a tax of 1 percent of gross pay roll starting in the year 1936 and increasing to 3 percent in 1938 and thereafter, all of which is paid by the employer, and provides that if any state enacts an unemployment compensation law conforming with certain standards set forth in the Federal act, employers may take as a credit against their taxes payable to the Federal Government under the Federal Social Security Act, the amounts paid for unemployment compensation to any state up to 90 percent of the levy made by the Federal Security Act. However, bear in mind that if a state has an unemployment compensation law which does not conform to Federal standards, the employer will be compelled to pay under both the nonconforming state law and the Federal law, or if a state has no unemployment compensation law to pay under the Federal law, and have his employes receive no benefits.

The taxes which will be required to finance this act will amount to more annually than levied by any other taxing statute, including the income, war and excess profits tax acts of 1917 and 1918. The ultimate annual tax cost of the Federal Social Security Act will amount to almost $6,000,000,000 by the year 1980. The tax cost for the year 1936 will be approximately $350,000,000, for 1937 approximately $1,000,000,000, and by 1949 the annual cost will have progressively increased until it will be approximately $4,000,000,000. Thereafter, between 1949 and 1980 it will further increase to a point between five and six billion dollars per year.

Of this total staggering annual tax cost, the act levies directly against industry a payroll tax which will amount to about $2,000,000,000 per year and levies directly against the employes a pay-roll tax which will amount to about $1,000,000,000 per year. In addition to these direct taxes, the Government will be required to levy a general tax of between two and three billion dollars per year to finance the provisions of the present act.

The natural question is, what will be the effect on industry and the country in general of these tremendous additional burdens? To start with, it is entirely possible that the levies or taxes imposed for old-age benefits and for unemployment insurance may be unconstitutional. The old-age benefits apply only to a selected group of individuals who may be fortunate enough to have employment after the effective date of the act, and there may be serious question as to whether Congress can levy such specific taxes and go into the insurance business for the benefit of part of its citizens. Also as far as unemployment insurance is concerned, there is serious question whether the levy imposed by Congress is a tax or whether it is merely a penalty assessed against the employer to compel the state in which he is located to pass an unemployment insurance act in order that the employer can retain 90 percent of the imposed levy and pay this to the state for the benefit of his employes. These questions will in all probability be litigated, but industry, generally speaking, I believe, will for the present comply with the provisions of this act without legal or moral objection, even though some features of it, particularly the unemployment insurance feature, will I am sure be found inadequate, ineffectual and, as will be pointed out, possibly even vicious, and also in spite of the fact that the administration of this act will involve

a bureaucracy and red tape which will undoubtedly create endless jobs for political office-holders and make our present Federal bureaus seem as pigmies in comparison.

After all, the direct tax or levy is uniform and will be a constant item of cost for industry as a whole, with a minimum of inequalities. On this kind of a set-up the only way in which industry in general can maintain its existence and earn the requisite return on its investment is to consider this an additional item of cost which must be recovered in the selling price. In other words, a uniform tax of this nature must eventually be paid by the consumer. However, when the price which the consumer is required to pay for the products of any industry becomes excessive, so that sales decline, industry may find itself compelled either to reduce the number of employes or to cut wages to the extent that the additional tax cost of this act is building up consumer sales resistance. I would expect that this practice would be more prevalent in times of depression, when competition is particularly keen and employment hard to get. At that time certain employers of labor will undoubtedly try to have these taxes absorbed by their employes in order to place the employer in a relatively better competitive situation. However, I feel sure that industry as a whole, and certainly so-called "big business," will stand 100 percent behind the Social Security Act for the present, without any chiseling. At a later date there may be disaffections among employers on account of the results of the unsound unemployment compensation feature in the act.

For just a minute let's consider the problem of the Government's administration of this act and how effectual the present taxing rates will be in building up a reserve which will be sufficient to pay the required benefits. First as regards administration. As stated before, there will be some 40,000,000 employed individuals who will be subject to the old-age benefit and unemployment insurance features of this act. For each one of these individuals the Government must keep at least two ledger accounts, which means that there will be 80,000,000 ledger accounts to be kept current by a new crop of political office-holders. If John Jones is employed one day in the year 1937, his employer will pay a tax on the wages which he paid John Jones and will deduct from the amount he paid John Jones the tax which Jones must pay to the Government under this act. The employer will then report the total amount he paid to Jones for his labor that day and will pay the tax, both for himself and for Jones, on the sum which Jones earned. This then entitles Mr. Jones to at least two ledger accounts with the Federal Government to keep track of these items. This employment might have taken place in San Francisco. Later on Mr. Jones turns up in Miami and gets one day's employment, and his employer must go through the same routine and the Government must, upon receipt of the employer's report from Miami, locate the ledger accounts of Mr. John Jones of San Francisco, who previously has worked one day. Suppose this goes on until Mr. Jones has worked five days over a protracted period, and each employment being in a different locality, requiring the searching of records, etc., in order to locate this gentleman's accounts. Under the act as now drawn, Mr. Jones would neither be entitled to any unemployment compensation benefits, nor to an old-age pension, but it is necessary under the act to keep track of these amounts of wages earned, because when Mr. Jones becomes 65 years of age or dies and proper proof is presented to the Government, the Government owes Mr. Jones, or his estate, as the case may be, $3\frac{1}{2}$ percent of the total wages which he earned in the five days which he worked, and if Mr. Jones earned as much as $3 a day, or a total of $15 over the period, he or his estate would be entitled to receive from the Government a total sum of $52\frac{1}{2}$ cents.

Of course, the absurdity of this is apparent and the practical impossibility of keeping track of these itinerant individuals who intermittently are employed is going to make impossible the administration of the act with respect to these provisions.

Now aside from the mere mechanics of administration, how is the act going to work from a financial point of view? Are the taxes which are levied to vitalize the benefits afforded going to be sufficient? Point number one in the consideration is that the Government in computing actuarily the taxes which they have imposed in order to furnish the money to pay the benefits required by the act have considered that the amounts collected from these taxes in excess of the amounts currently required to pay benefits will be set aside in a reserve fund which in turn will be invested in securities of the United States or guaranteed by the United States, which will earn interest and such interest be added to the reserve fund. On this basis the Government figures that they will have enough money to pay the old-age benefits. As far as the public at large is concerned and taxpayers in general, it must be borne in mind that the interest which the Government is going to add back to the reserve fund to pay these benefits can only be secured by taxation from industry and the general public. What happens is that the Government is taking out of its left-hand pocket money to pay interest on this fund into its right-hand pocket, but the lamentable feature is, the only way the money can get into the Government's left-hand pocket is through taxation of the general public. Therefore industry and everybody else must consider that, in addition to the taxes which are specifically assessed for the purpose of making possible the benefits under this act, they are also paying at

least three-quarters of a billion dollars per year for state aids and a large amount in taxes in order to build up a fictitious interest account in the social-security reserve. That interest alone by 1970, which must be collected in taxes from the general public, will amount to $1,000,000,000. Bear in mind that the reason that the additional taxes must be levied in order to pay the interest is because the Government must invest the funds received through specific taxes levied against the employer and employe, in United States Government securities or securities guaranteed by the United States Government.

Further, remember that the reserve which is to be accumulated and invested in these Government securities will total the staggering sum of $33,000,000,000 by 1970. In other words, between now and 1970, in order to make available for the Government to invest this amount of money in United States securities, it is going to be necessary to increase the public debt by a considerable portion of this $33,000,000,000. The implication of this act is to commit the Government to a continuing increase in the public debt which can only be accomplished by increased annual public expenditures. The invitation to a public spending orgy is written by Congress in this act, and if followed can only end in wild inflation or a socialistic form of Government with everybody on the public pay roll.

On top of all this, also consider that on the best available figures the amount collected in specific taxes, plus the interest paid to the Government by itself, will by the year 1980 be less than the total benefit payments paid out currently. In other words, on the best actuarial figures now available we are going to find that by 1980, if not sooner, there will be a deficiency in collections and a higher tax will necessarily be levied to maintain even the present contemplated annuities. It is quite likely that this situation will be early recognized and levies increased in the relatively near future in order to meet this situation. Particularly will this be so, because the actuarial tables computing these reserves have not made allowance for depression periods in which the income from pay roll taxes will obviously fall far short of the estimates. The fact is that it is not possible to make a reliable estimate of either income or outgo, and therefore it is impossible for the act to guarantee the old-age benefits provided therein.

In any discussion of the probable outcome of the social-security program now embarked upon by the United States, some consideration necessarily must be given to similar plans which have been tried out in other countries, principally Germany and Great Britain. Due to the wide variance in wage levels, living conditions, and other factors affecting the situation, it is impossible to make a true comparison without exhaustive analysis. However, the experience in these countries foreshadows what may be in store for us. The English plan of pensions has been in operation in some form since 1908, and in Germany since about 1889. However, at no time has either one of these plans contemplated such large benefits and reserves as must be built up through our plan. At the present time both the English and German reserves have been wiped out and the funds are in debt to their respective governments, and in addition it has been necessary to reduce the benefits to the most meager allowances.

After some slight study of the plans in Germany and England, and the general effects of these plans on the security and temper of the people in those respective countries, and after some 15 years' intermittent exposure to activity and administration in Washington, my conclusion is that although the old-age benefit provisions of the present Social Security Act are a laudable attempt to correct the social insecurity which has grown up in our industrial state, this attempt has been prematurely made at a time when industry could least afford it and has also been poorly executed because insufficient study and consideration were given to the problem, with the result that unless modified to a considerable extent the plan must fall of its own weight or lead the country into financial and economic excesses which will be disastrous.

As to unemployment compensation, there is little question that whatever are the taxes which are likely to be charged by the states to put unemployment insurance in effect, they will be entirely inadequate to guarantee any substantial amount to unemployed individuals. Even if it were desirable to do this, it would be impossible to effectively collect sufficient money from the employers to guarantee over any protracted period of unemployment an adequate sum to take care of the needs of the unemployed. For example, it is estimated that if the unemployment compensation provisions of the present Security Act had been in effect in the various states for 10 years prior to the recent depression, the net accumulated reserves, after allowing for unemployment payments annually to those who would be seasonally unemployed, would not have sufficed for more than 18 months of the present depression.

Wherever tried, unemployment compensation has been a boomerang and has fostered unemployment and insecurity rather than eliminating it. It is easy to understand how a racket in illicit labor could be developed in a country which is as fertile a territory for rackets as the United States. It would be a simple matter for unscrupulous employers to corral unemployed individuals who were receiving unemployment compensation and persuade them to work for lower wages than normally paid and still maintain their unemployed status because such employers would not report these individuals as being in their employment, which at once would eliminate the necessity of the employer paying the old-age pension and the unemployment insurance tax on the employe's wage and would give the dishonest employe a double income; one from the state unemployment compensation fund and the other from his bootleg employment. This type of evasion has been most common in Germany, where it has been practiced in a wholesale manner.

Also where unemployment compensation is being paid in times of temporary letoffs, there is disposition on the part of many employes to collect their full quota of unemployment compensation before seeking reemployment, even when available. A law of this kind encourages evasion and the continued violation of a statute which is so easy to violate fosters general disrespect for existing law and has vicious reactions. This was clearly evident in the attempted enforcement of the prohibition statute, and it seems to me that the operation of the present unemployment compensation provisions of the Federal Social Security Act, if carried out by the states, will to some extent have a similar effect.

Unemployment insurance in itself has undesirable social reactions, but if we are going to have unemployment insurance, then the employe should contribute toward it. This would permit more adequate reserves to meet emergencies than is possible if the amount is to be contributed solely by the employer. As the tendency of the employer is to reduce costs, the burden of this tax will encourage him to seek short peaks in production with long slack periods in between, during which only a skeleton organization is retained, and will penalize such employers who attempt to carry their employes through times of lessened industrial activity. Thus the provisions of this act are likely to increase the ills of unemployment, rather than to alleviate them.

If the Social Security Act in its present form remains the law of the land for many years, the ultimate effect is bound to be the socialization of industry or complete collapse through violent inflation. Before we finish the program set up by this act, we'll find practically everybody receiving gratuities from the Federal Government. When this happens, there will be insufficient earning power to support the program. During the present depression we have seen one group after another extract from the public till money which they did not earn. The hog raisers have been paid bounties for not raising hogs, the farmers for not raising wheat, the cotton producers fictitious prices for their cotton. We are going to see a powerful lobby of veterans intimidate Congress and the administration into paying a bonus for services for which they have already been paid. We have seen one group after another exact tribute from the country as a whole through special tariffs on this and that in order to preserve industries which cannot endure without these subsidies.

As long as the aggregate of these various groups with their individual subsidies equalled substantially less than the total population so that there still remained a sizeable group to work and sustain the groups who were taking something and giving nothing, there has been a chance for the remaining industry and population to bear the burden. Now we witness the first wholesale raid on the Public Treasury. We see in the

(*Concluded on page* 32)

Wheels of Government

MOST timely is the dedication of the strikingly beautiful Supreme Court Building, standing as it does in a commanding place in the Capitol group. As legislators in the future look to the east from the Capitol, the Supreme Court Building in its beauty and grandeur cannot help but command the respect intended and due to the judicial branch of our Government. Surely this was the intention of the founders of this nation and surely the presence of this magnificent building, especially at this time, will have psychological effect upon our legislative bodies.

As the Supreme Court convened on the first of October, there were a number of tests of the new legislation before the court for consideration. In the course of the month, action was taken on 278 petitions for certiorari (attempts to bring cases before the Supreme Court). Two hundred and twenty-four petitions were denied and 54 petitions were granted, and the cases covered will be reviewed by the court. Under the cases listed for review are those of the Hoosac Mills and the TVA. The Hoosac Mills case is a test of the validity of the AAA processing tax and is based on the AAA act as it stood before it was amended by the first session of the Seventy-fourth Congress. These amendments were made with the intention of definitely fixing the constitutionality of the Act. The TVA case questions the right of the Government to generate electric energy and to resell it at retail.

The Social Security Board authorized under the Act enacted by the recent Congress, is devoting its time to the drafting of state unemployment compensation plans. Until recently the Board had acted only to the extent of supplying information to the state legislative bodies upon which unemployment compensation laws could be drafted. Now the experts of the Board are busily engaged in the actual preparation of model laws which they state will be available for the public and for the interested groups in the various states in the near future. It is understood that the model plans will include three general types which will be acceptable under the Federal Social Security Act.

1. Employer reserve.
2. Pooled funds based on fixed tax rates.
3. Pooled funds to be based on experience with tax returns.

The first type is that adopted as the Wisconsin plan followed by the eight states which now have unemployment compensation statutes. The tax under these laws is levied upon the employers and is assessed for such periods as are necessary to maintain the proper reserve account for each individual employer. The second type contemplates that either the employer or the employer and employe jointly shall contribute to a pooled fund, with tax rates definitely specified in the law and without regard to the individual employer's experience. The third type is based upon either employer or joint employer and employe contributions and provides that the maintenance of the reserve account shall be based on experience and need. In this method the rates of tax are subject to periodic change at the discretion of the agency in charge. This is the method preferred by the staff of the Social Security Board.

There have been the following appointments to the staff of the board: The Unemployment Compensation Division now has as its head Merril I. Murray, formerly Technical Advisor to the Economic Security Committee and a former Director of the Minnesota Employment Service. When the Board is formally organized, following a congressional appropriation by the second session of the Seventy-fourth Congress, the appointment of Executive Director Frank B. Bene will be confirmed. He is, at the present time, Director of the American Public Welfare Association. Other appointments are: Thomas E. Eliot, General Counsel for the Board, now associate solicitor of the Labor Department; and Henry P. Seidemann, to develop an accounting system for recording benefit payments under the title of Coordinator for the Board.

The National Labor Relations Board, created by the Wagner Act, has received four complaints of alleged violations: (1) The Pennsylvania Greyhound Lines, Inc.; (2) Delaware-New Jersey Ferry Company; (3) The United Fruit Company; (4) the Fruehauf Trailer Company. Beginning October 22, the board, with all three members present, heard three days of testimony in the Pennsylvania Greyhound Lines, Inc., case at Pittsburgh. An objection on the part of the defendant company that the Board had no jurisdiction and that the act is invalid, was overruled and testimony was taken from nine employes alleged to have been discharged for union activities. Following the hearings the case was taken under advisement by the board and a decision is expected in November. Should the decision uphold the complaint and the Pennsylvania Greyhound Lines, Inc., refuse to comply, the procedure indicated is that the board will cite the defendant to the United States Circuit Court of Appeals in the District of origin on the judgment. If the Circuit Court upholds the decision, the defendants have the alternative of complying or of being charged with contempt of court. Defendant may make a final appeal to the Supreme Court of the United States on constitutional grounds only, challenging the validity of the Act.

The National Bituminous Coal Commission, created under the Bituminous Coal Conservation Act of 1935 (Guffey Act) has proceeded with the issuance of general orders containing the "Bituminous Coal Code" and a series of forms for acceptance of the code and for developing the details of organization of the 23 district boards throughout the country. It is to be noted that on each one of these boards, there will be a labor representative from the United Mine Workers of America, which is the only labor organization recognized by the board. Under the case brought by President James W. Carter of the Carter Coal Company in the Supreme Court of the District of Columbia, a temporary order was granted by the court enjoining the coal company from subscribing to the coal code under the Guffey Act. The court refused Carter's plea for a temporary injunction restraining the government from collecting the 15 percent tax imposed by the Act. Collection of the 15 percent tax is effective as of November 1, and is payable beginning January 1. The court ruled that Carter must post a $15,000 bond, which, in the event the act should be held valid, would indemnify the company for loss sustained by reason of not sub-

(*Concluded on page* 33)

Of all things . . .

YOU can believe it or not, but the Resettlement Administration was offered the grounds and buildings of a defunct college by the trustees of the school . . . "so that it could raise its own brain-trusters." . . .

■ ■ ■

The offer was turned down flatly. . . . The trustees are supposed to have been told "that not only can we supply the current consumer demand for brain-trusters, but we may have to do some plowing-under before election." . . .

■ ■ ■

Once upon a time in the early days of the New Deal reporters saw in Secretary Perkins' tricorn hat a symbol of the department. . . . Everything had at least three sides. . . . The Secretary now wears a round hat . . . and the reporters complain there is no point to anything around the department now. . . .

■ ■ ■

Then there was the new chief of a Government legal division whose first interoffice memorandum to his underlings stressed the importance of proper punctuation. . . . His lawyers are now putting a question mark after everything they write regarding a forthcoming New Deal Act before the Supreme Court. . . .

■ ■ ■

General Hugh Johnson is currently discussing some "lousy aspects of this Administration out of unswerving loyalty to the President." . . . We'll bet F. D. R. is overjoyed at these signs of loyalty. . . .

■ ■ ■

The NRA has been dead three months. . . . Payroll for its "skeleton" force is ten million dollars a year. . . . Which is probably a new record high for professional pallbearer hire at one funeral. . . .

■ ■ ■

The report is that the Administration may not make public the replies received from the clergy in answer to the now-famous President's letter . . . "that they will be filed away for future use." . . . But copies of some very interesting answers are also being filed away by Anti-New Dealers . . . for use in coming campaigns . . .

■ ■ ■

The sweeping success of the corn-hog referendum wasn't unexpected by Secretary Wallace. . . . But to make it good he expressed doubt about prospects at a press conference a few days before the vote. . . . Frightened farmers, fearing the end of benefit payments, trooped to the polls to roll up 17 to 1 majorities in some States. . . . And two days later came the President's edict that AAA must be a permanent part of the farm program! . . .

■ ■ ■

Tidbits from the President's latest press conference: . . . F. D. R. holds aloft a blue pencil, explains it's an annual autumn present from the budget director, that he is going to use it. . . . And then from the back of the crowded room, pipes a correspondent's voice: "Won't you need a red one, too?" . . . Everybody laughed, even the President. . . .

■ ■ ■

Later the President warns the correspondents to "lay off" the budget in advance, that he would have a "session" with them when it is made up in January. . . . And what, queried a reporter, about Prof. Tugwell's speech that "emergency lending agencies would be liquidated and the recoverable assets applied to the national debt." . . . The President didn't hesitate. . . . That was just as wild as the average press story about the budget, he answered. . . . Again everybody laughed, except the President. . . . And that's why a lot of people think that Prof. Tugwell will be needed in Geneva when the campaign rolls around. . . .

■ ■ ■

The Administration continues to set precedents. . . . For the first time in the history of the Nation, its Secretary of the Treasury was acting President, technically, of course. . . . It happened recently when the President was in Hyde Park, Vice President Garner in Japan, and Secretary of State Hull at Pinehurst. . . . Youngish Henry Morgenthau then became the ranking Government official in the Capitol. . . .

■ ■ ■

The Federal Housing Administration denies that it "has merely scratched the surface" in housing activities. . . . Two hundred million of the one billion dollars in loans it has made went to "preserve, protect and beautify the surface" through painting. . . .

■ ■ ■

Secretary of Commerce Roper's office is very ornate . . . in fact, for a republic, it's rather kingly. . . . It even awes the reporters when they come for a press conference. . . . One of them arrived early . . . What, queried an attendant, who is as haughty as his surroundings, are you waiting for? . . . For prosperity to come around the corner, the reporter mumbled under his breath. . . . Then, answered the attendant, who hadn't heard the retort, you had better take a chair. . . . Which, the reporter told his colleagues later, is one way of catching prosperity at the Commerce Department. . . .

Combined flotation, roasting and cyanide plant, Cripple Creek, Colo.

Recent Trends in Design and Construction of Gold and Silver Mills*

By EDWARD L. SWEENEY†

THE purpose of this paper is to outline modern trends in equipment and construction of Milling plants for the treatment of Gold and Silver ores. It is not intended to cover the metallurgical angle, as in recent months this phase has been covered by several writers.

Most plants for the treatment of Gold and Silver ores are well under 500 tons daily capacity, larger ones being the exception rather than the rule, so that in this paper it is these smaller plants which are discussed.

Testing

The proper sampling and testing of the ore reserves is naturally the first essential to proper plant design. Several laboratories capable of performing test work are available and this should always be the first step in the planning of a milling plant. After the testing is complete it is just as important that the test results be interpreted by engineers who have had years of experience in more than one area. Only by following the above plan can the proper equipment be selected and the best and cheapest possible plant be erected.

Crushing Plants

Bins are an important factor in a properly designed milling plant. They should be of as large capacity, both the mine and the crushed ore bin, as is the plant capacity per day. This should be the minimum. Depending on the mine conditions, they should generally be much larger. As run of mine ore is hard to handle and requires more expensive equipment, the larger portion of the ore bin storage ahead of the mill is more often found in the crushed ore bins. Many designs of bins are used, the trend in recent years on this type of plant being toward round wood or steel bins which are found to give more available capacity per dollar. Mines just going into production especially, should have good tonnage capacity in bins, as it will generally be found that the mine in its early months of production will need this aid to keep the mill running full tonnage.

For coarse ore feeders, the Chain Type Ross Grizzly is proving a real advance. This should be installed with a variable speed, if possible, so that rate of feed may be better controlled. For feeding of crushed ore the older types of regulated feeders are still more often used, but the vibrating type of feeders are being selected for many new plants.

Primary crushers remain the old favorites, either Jaw or Gyratory type. It is not common practice today to spend much money in removal of fines from primary crushers, if a secondary crusher is to be used. In the smaller plants—say up to 150 tons daily capacity—most installations for crushing consist of one crusher only to reduce the run of mine ore (usually held to 10-inch mine grizzly size) to from ½ inch to ¾ inch for grinding mill feed. It is found that two stage crushing does not pay on this size of plant, as, at least, two types of crushers, which have been well proven in practice, are now available which will make such a reduction in one pass. In this case it is necessary to remove all fines possible ahead of this type of crusher. For secondary crushers, the Cone type still holds the field. Short head type cones also are increasing in number where large tonnages are being milled, or where the ore is exceptionally hard or requires very fine grinding. A newer type of cone crusher is also now on the market which takes 10-inch ore and reduces it to under ½ inch in one stage. Roller bearing crushers are being installed in many of the smaller sized plants where one machine does all the crushing.

Grinding and Classification Circuits With Accessory Equipment

The Ball and Rod Mills of the past are still the chief means used for reduction of ore to "milling" size. Depending on the tonnage to be milled Secondary and even further stages in grinding are practiced, the latter, however, seldom pays except in tonnages over 1,000 tons per day. Many types of grinding circuits are used, depending entirely upon the nature of the ore and the required fineness of the grind. Here the new price of the precious metals affects the flowsheet. It is nearly always good economy to remove any "free" as early in the flowsheet as is possible. In order to accomplish this result many old and some new ideas are being used. Among these may be mentioned the old familiar Amalgamation Plate, and its newer children, the various types of amalgamators. Some mills are making the majority of their recovery in this manner, thus lowering the value of concentrates to be shipped, and receiving a

* Presented at Metal Mining Convention, American Mining Congress, Chicago, Sept. 23, 1935.
† Consulting Engineer.

higher price per ounce for this first product made. Where coarse mineralization is found small screens are often placed on the discharge trunnion of the grinding mills and the undersize of the screens treated by unit cells, tables, gold traps, etc. In this way coarse mineral is recovered at low cost and if "free" gold is thus recovered, it is common practice at many plants to treat these "super" cons by barrel amalgamation, grinding pans, etc., and shipping the residue along with the balance of the concentrates of the plant. Gold traps set at several points in the flowsheets are being used more and more. Most operations, however, I find, prefer such equipment as jigs, unit cells or tables for this work due to the fact that the latter require less attention and work steadily. The older method of collecting metallics from grinding mills and classifiers is still often used in smaller plants. The use of the very old method of corduroy and other types of cloth for the catching of free gold is common again today. These are used at various points in the flowsheet, the most common being between the grinding mill and the classifier and in the tail race. Movable tables of various sorts, which tend to clean themselves, are also finding more and more use today. There are many methods used in this connection, as pointed out above, the intent of all of them being to recover as much "free" as possible, and early in the flowsheet; thus, not only insuring the recovery, but also giving a larger net price per ounce for the metal thus recovered.

The familiar rake type of classifiers are most common in the grinding circuit. Improved types which give less oversize in the classifier overflow are a new innovation and have proven their worth. Heavier construction in classifiers is the trend today. Spiral types of classifiers are also becoming more of a favorite, especially in certain districts where they are well known. Now that the older method of sand and slime treatment by cyanidation is coming back, it should be pointed out that for the best possible separation a bowl type classifier should be used. They will allow of a finer mesh being placed in the sand tanks with the rate of percolation not being reduced. A modern grinding circuit for gold and silver ores requires the ability of persons with long experience in milling if the best possible layout for a particular ore is to be obtained.

Concentration

As pointed out above, today, a certain portion of the concentration is often done in the grinding circuit. Gravity methods are seldom used today as the chief method for the concentration of an ore, however, they are still used as an accessory to other means of concentration.

Tables and jigs mentioned above are examples of this practice. On some ores the removal of a small portion of the mineral content by gravity means has allowed much better metallurgical results and operating costs for the balance of the ore. An example of this is where cyanicides have been removed from cyanide plant circuits with resultant lower cyanide consumption on the balance of the ore.

Flotation is perhaps still the most often used process for the treatment of gold and silver ores. It is better known today than is cyanidation. It costs less to build a flotation plant than any other type, and it also gives lower operating costs. Due to the above reasons, very often flotation plants are installed for the treatment of gold-silver ores where cyanide plants would give far better economic returns. However, there is no question but that flotation plants are the best for many ores. Mechanical types of flotation machines are practically always installed. Many types are on the market and all have some merit at least. However, it behooves one to select machines which are well built and give a high degree of agitation and aeration. On gold and silver ores, conditioners are often needed and will allow of less flotation equipment being installed. Reagents used are the same as in the past few years in most cases. Some new ones, however, have been developed. In this connection operators should keep in touch with developments as they may lead to better savings and/or lower reagent costs.

350-ton Flotation Plant

For example, within the past year, two new applications have come to my attention, powdered coal having raised the extraction of one plant treating a badly oxidized gold-silver ore by 10 per cent and also increased the grade of concentrates. At another, lead acetate has been found to be of great aid.

Simplicity of design in flotation plants will be found to give far better operating as well as capital costs.

Cyanidation

Cyanidation is again meeting with favor due chiefly to the higher economic returns which may often be made from a gold-silver ore by this method, with the new conditions which cover the sale of concentrates and precipitates or bullion. This phase has been well covered by many writers. The higher capital and operating expense of a cyanide plant as vs. a flotation plant should be carefully investigated, as it will be found that more often the cyanide plant will give the larger net returns under existing conditions.

All sliming is the most popular method. It gives a simple flowsheet as vs. sand-slime treatment, and this factor appeals to many operators. At some plants it has been found that, by removal of the primary slime and the treatment of this slime separately, or the by-passing of it at once to the treatment plant, economies will result. This is just another example of the progress in recent years, and also calls attention to the fact that one cannot have too broad an experience if the plant is to be properly designed and the best results obtained.

Sand leaching and agitation of the slimes portion is also coming back. It has been found in several recent installations that this method will give as good extraction of the values, at a lower operating and capital cost. In this connection, again it should be pointed out that good classification is essential for the best possible sand leach conditions. If classification for this purpose is properly carried out, finer sizes can be introduced safely in the leaching tanks.

Equipment in use today follows in many cases along established lines of past years. The familiar types of rake thickeners are still in use in most plants. Spiral type rakes which allow of the pulp being collected at the center in one revolution are finding favor at many plants. Practically all plants use a decanting thickener ahead of the agitators where grinding in solution is practiced, as is usually the case.

A new innovation where building costs are high is washing tray thickeners of multiple decks. These should not be confused with the older type of tray thickener. In all slime plants many methods are in use for the washing of the pulp. The older counter current method is often used, especially where the tanks do not need to be placed under cover. Climate is a larger factor in the proper decision of the washing flow-sheet, as the various possible methods require various sizes of buildings. In colder climates the tendency has been to use more and more filters for this purpose; more recently, however, the tendency seems to be back to the thickeners.

The use of, at least, one filter at the end of a string of thickeners is perhaps the most common. At some plants two filters in series with repulpers between them are used. Most engineers feel that one filter should be used for positive wash before the slime tails are

discharged. Diaphragm pumps on the thickeners are practically always used, and today, improvements have also been made on these pumps.

Slime presses are in use at some plants. They give positive results, and with sufficient capacity installed, will allow of any degree of washing desired to recqver the dissolved values and cyanide. The higher the grade of ore, the better the washing, which should be done on the slimes. The Butters and Moore types of filters are also coming back in certain localities.

The old types of mechanical agitators are in use today at many new, as well as the older plants. New types of agitators which tend to give a higher degree of agitation and aeration are also popular and are being installed in many plants. Practically no new installations contain Pachuca and similar types of agitators in the United States. Most operators hold to the idea that the more air the better, during the agitation period.

On certain ores roasting is still required, especially the tellurides. Exceptionally high extractions are being made on most difficult ores where roasting proceeds cyanidation. Roasters should not be installed, however, unless there is no other method of obtaining good extractions.

Nearly all plants turn to the Merrill-Crowe process for clarification and precipitation of the pregnant solutions. New developments which have met with great favor include the new low level type plants which are almost fool-proof and which give the best of clarification and precipitation result at low costs on practically all ores. On some ores, the precipitation press is still the best bet, but in very unusual cases. High grade zinc dust is used in most plants for precipitation.

Cyanidation of Flotation Concentrates

Here again the new economic conditions have lead to plants for the cyanidation of flotation concentrates being installed at many mines. Saving of freight and treatment charges plus higher market value per ounce of gold or silver being the cause. Such plants should never be installed without proper testing having been done on commercial flotation concentrates produced from the main plant. Neglect of this precaution has lead to the failure of several such installations. It is just as essential, if not more so, to test concentrates if such a plant is contemplated, as it is to test the original ore before the mill is designed or erected.

The equipment used is generally the same as is used in all-slime plants, save of course, much smaller in sizes. A regrind is found to be necessary on practically all flotation concentrates before high extractions can be made by the cyanidation method. Lime is generally added to the grinding circuit in such plants.

Power

Small milling plants are better off if they purchase their power from established power companies—even at comparatively higher rates. Operation of Diesel and other types of prime movers at remote points do not always work out as the mine owners expect. When power is generated at the mine, the most common installation today is the Diesel engine. The two DO's are to buy a good make of engine—not the cheapest—and to have at least one good Diesel man available. For the smaller mines very good Diesel units are now available which will give operating results comparable to the larger units. Steam plants should be installed only on larger installations; such as for mills which use over 1,000 hp. Hydro-electric power should be used when available, but this seldom seems to be the case at gold-silver mines.

In recent years power companies are paying more and more attention to the power factor, with the result that in many localities such companies now penalize for poor power factor conditions and reward good power factor results. In mills the best point to correct a poor power factor is on the grinding mill installation. This has the larger power use and the leading motor manufacturers now have available, at low cost, synchronous motors which will give results comparable to slip-ring type motors for this service, and at the same time, correct the power factor. Where mine compressors are installed on the same general circuit this also is an excellent place to correct the power factor, as when not in use, if allowed to idle, it will give a very high degree of power factor correction, and also it is out of the dust conditions found in the grinding circuit.

Water and Transportation

Care should be taken in planning a milling plant to see that proper consideration is given to water available and to the transportation of ore from mine to coarse ore bins of the mill. The plant site itself should generally be governed to a great extent by these factors if the lowest capital and operating costs are to be arrived at.

The cheapest manner of increasing the natural water supply for a milling plant is by the installation of a tailings thickener at the foot of the milling plant. Tailings dams in colder climates may often prove to be a great disappointment in the colder months as a source of water supply. The building of a proper tailings dam will be found not to be as simple as many mill operators have supposed. On the other hand, plenty of information is available to guide operators in the proper method of tailings dam construction.

General Construction Considerations

The size of the plant to be erected should naturally fit the ore developed. Where mines are just going into production, however, proper consideration should be given for possible expansion of the milling plant. On plants of smaller sizes, it will be found that the crushing plant will necessarily be of a capacity larger than the initial plant will require. Certain size crushers will be needed simply to reduce the ore. The ore bins ahead of, and following the crushing plant, should be so laid out so that natural expansion can take place as desired. Available space should be left so that cyanidation of flotation concentrates may follow, if found to be desirable later, in the case of flotation milling plants. Today properly designed steel buildings will be found as cheap, and will give better service and fire protection than frame buildings. In smaller mills, bolted construction is generally used.

The more simple the plant layout can be made, the better will be the results and the costs. Unnecessarily complicated flowsheets spell grief for the operator.

Conclusions

Many methods of treatment of gold and silver ores are available today, when it comes to the details of the flowsheet and the equipment which will do the work in the best possible manner and at the least possible cost. Therefore, it is very essential that testing of a representative sample of ore be carried on before any plans are made for the plant. Where information of a definite nature of milling results on similar ores, from the same district, is available, this limitation does not so strongly apply.

It is just as important, however, with the many developments that have and are still taking place, that these test results be interpreted into equipment and flowsheet by men of broad experience, if the best and cheapest possible plant is to be designed and erected.

Obituary

E. H. Suender, for many years identified with the anthracite industry, more recently affiliated with the Consolidation Coal Company, died suddenly on October 8 at Fairmont, W. Va. Mr. Suender became associated with the Lehigh Coal and Navigation Company in 1901 with which company he remained until 1916 when he became affiliated with Madeira Hill & Company. In September, 1934, he joined the staff of the Consolidation Coal Company.

P. H. Argall, president of the Peru Mining Company, at Deming, N. Mex., died on September 30.

Following graduation at the University of Colorado, Mr. Argall was employed by the Anaconda Copper Mining Company; later connected with the American Smelting & Refining Company. He was superintendent of the Strattons' Independent Mine. In 1915 he transferred his activities to New Mexico. In 1929 he was made manager of the New Mexico division of the Peru Mining Company, which position he held until his death.

Experience in the Use of

DETACHABLE DRILL BITS*

By HARLEY A. COY†

THE ore-bearing horizon at Mascot is dolomitic limestone. The metallic mineral is zinc sulphide and occurs principally as completely filled veinlets or seams in limestone and in association with secondary dolomite. Such average Mascot ore presents no particular drilling difficulties; but occasional chert beds or chert nodules are present and these, when encountered, retard drilling progress and increase the wear on bits.

Mine advancements made there from year to year have increased transportation distances from working places to haulage lines, and the additional time required to go to and from working places has reduced actual drilling time, thereby giving added importance to better drilling performance.

All stoping and drifting is under contract. Each stope contractor is himself a drill operator. His returns are based upon the tonnage obtained from his working place. In addition to operating his machine he is required to lay air lines, to set up his equipment, and to keep the roof of his working place in safe condition. The production from his stope—and, therefore, his return—is dependent upon the amount of drilling he may be able to do after these duties have been performed. The drilling time lost in the transportation of steel also results in a loss of production and, accordingly, reduces the contractor's return.

The heading-and-bench method is followed in mining. Stoping drills are of the 3-inch-diameter type. They are mounted for heading work; for vertical drilling on benches they are removed from the slides. Machines of the 3½-inch type are used in drifting and in crosscutting.

The blacksmith shop is centrally located on the main haulage level near the shaft. Its equipment consists of one No. 5 Ingersoll-Rand steel sharpener, of an oil-fired furnace, and of tempering vats. Adjoining the blacksmith shop is the detachable-bit room in which is located an Ingersoll-Rand bit grinder, bins for both dull and sharpened bits, and a rack for drill rods. Bit carriers, arranged in groups of two, hang on brackets on the walls of this room. Each group bears a drill operator's number, and this number also appears on the wall above the position of that pair.

All bits and drill rods are issued from this room by the blacksmith, and are carried by the men to their working places. Prior to the use of detachable bits, drill steel was distributed by locomotives to the men at points along haulageways and carried by them from those points to their working places. In a few instances, in the case of particularly inaccessible points, drill steel was transported from haulageways by mechanical means.

The drill steel that now serves for rods for detachable bits is of two types: 1¼-inch hollow round lugged steel in stoping and development work, and 1⅛-inch hollow round in short lengths for blocking, this having been substituted for the ⅞-inch hollow hexagon steel formerly used. A small quantity of ⅞-inch solid hexagon steel is employed solely in raise work where the stoping machines, being hand rotated, are not suitable for use in connection with detachable bits.

Upon the adoption of detachable bits, 2-foot drill-rod changes were made standard for all types of drilling. Recently, however, this length has been increased to 3 feet in order to reduce the number of rods and bits in service. Rods more than 10 feet in length are not permitted, except for special purposes such as prospecting, roof work, or slabbing.

The forged type of Carr bit had been in use at Mascot for many years, it having been demonstrated that it had a greater penetration speed per minute than the forged type of cross bit. However, in adopting the detachable bit, the cross-type bit was selected because of its greater safety and capability to hold gauge. The Carr bit, it had been found, had a tendency to wedge when a fracture zone, or ground of unequal hardness, was encountered. This tendency had been known to twist the machine to such an extent as to throw the operator from the bench.

Early in 1933, three makes of detachable bits were tested at a point in

THE "JACKBIT" ROOM

In this underground shop all bits are resharpened and placed in carriers, ready for the drill operators at the start of each shift.

* A paper read at the Metal Mining Convention and Exposition of the American Mining Congress at Chicago, September 24, 1935.

† Superintendent of Mines.

the mine where the rock formation appeared to be uniform and where a constant air pressure could be maintained. Included in the test were bits of the cross, Carr, and 6-point types, with both center and side holes. The usual procedure for determining penetration speed per minute and cutting-edge and gauge wear was followed. Data were obtained on the maximum footage necessary to run each type of bit to destruction, as well as on steel breakage and the effect of the various tempers on both rods and bits.

Following this preliminary test, bits of the three makes were tried out for a period under actual operating conditions, during which time 22 stope machines and four development machines were used. These various tests resulted in changing the bits for all stope, development, and blocking machines to the standard 1-inch cross-type Ingersoll-Rand detachable "Jackbit." A gauge variation of ⅛-inch per change was adopted, with 2⅛-inch starters being followed consecutively by bits of 2-, 1⅞-, 1¾-, 1⅝-, and (special) 1½-inch gauges.

During the experimental period the drill rods had been threaded by lathe, but this so weakened them as to cause a breakage of approximately 30 rods per drilling shift. This difficulty was overcome by the development by Ingersoll-Rand Company of a forging die for the drill sharpener by means of which the threads are now forged on to the rods. The forging of the threads, together with added experience in tempering, resulted in reducing the average breakage to 6½ rods per drilling shift.

During the test period the forming and gauging of detachable bits were done by a standard bench grinder. This proved unsatisfactory, and an Ingersoll-Rand Type J-2 electric-driven bit grinder, with a 12x1¾x1¼-inch forming wheel and a 12x1½x1¼-inch gauging wheel, has since been used. A type 36-WO Borolon wheel, manufactured by the Abrasive Company, was adopted. This installation bettered the grinding efficiency materially. Forming wheels of 1¾-inch width for larger gauge bits and 1¼-inch wheels for smaller bits are in use at present.

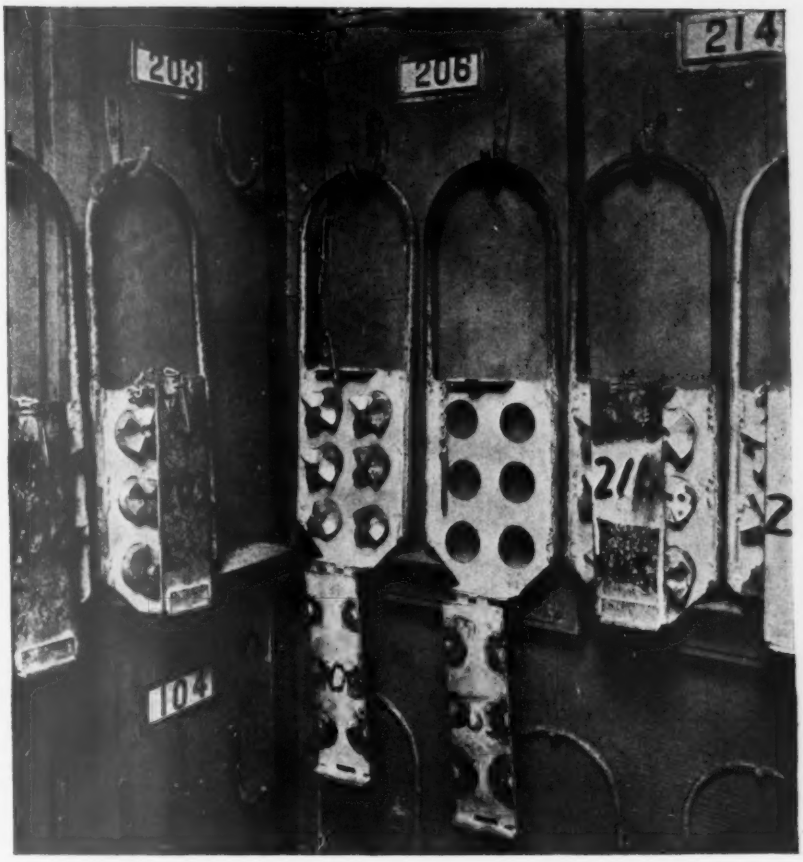
Each machine man is assigned two bit carriers, those for stope use holding six bits and those for development work holding ten bits. One carrier filled with sharpened bits is supplied at the beginning of the shift, an arrangement which allows one of each pair of carriers to remain in the shop each day for refilling. At the end of the shift each machine man is required to account for all bits received by him when the shift started. All lost or broken bits must be reported to the foreman, who authorizes the blacksmith to substitute others for them.

Usually five bits are sufficient for a machine shift in stope work. The sixth bit—usually, but not always, of 2-inch gauge—is furnished as a spare. Where two machine men are working in the same stope, an interchange of drill rods or bits is permissible, and this arrangement frequently prevents loss of time.

Owing to the accumulation of resharpened bits, the only new bits issued in actual practice are of the starter-gauge size, 2⅛ inches. When unusual gauge wear but not great loss in stock occurs, as when drilling chert, the bits are upset on the drill sharpener by means of a special die and bit holder developed in our local shop. All upset bits are ground, gauged, and tempered.

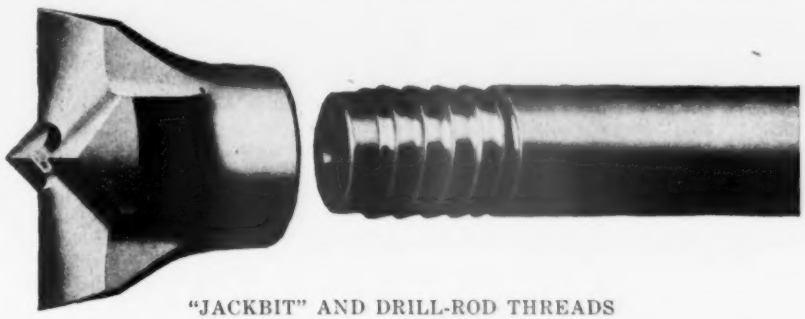
The average temper depth in a new bit is approximately ⅜ inch. After this hardness has been lost, bits are retempered. This usually follows the third grinding. For tempering, the bits are heated slowly to about 1,400° F., and are then placed in ⅜ inch to ½ inch depth of water, where they remain until cold. The depth of quenching is determined by the amount of stock in the bit.

"Jackbits" are carried in stock by Ingersoll-Rand Company at their warehouse in Knoxville. Transportation from the warehouse to Mascot, about twelve miles, is by truck, and all charges in that connection are included in the following costs.

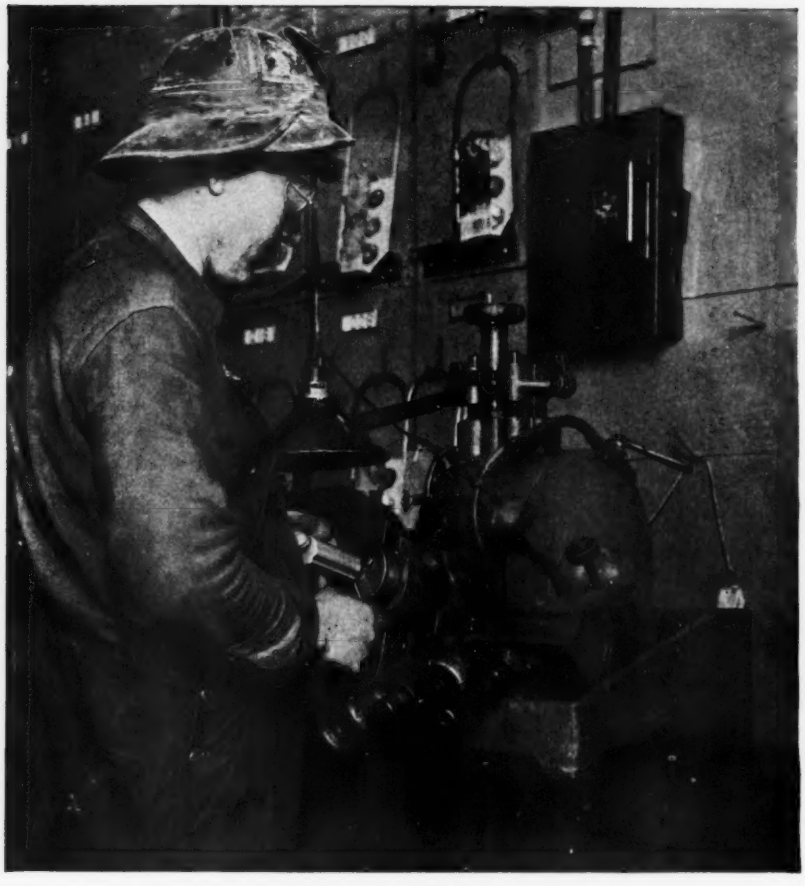


DETAIL OF CARRIERS

Two metal containers for "Jackbits" are assigned to each drill runner and are hung in numbered positions on the wall. Each man takes out a carrier full of sharp bits at the start of the shift and is accountable for its return at the shift end. Between shifts, the carrier remaining in the shop is filled with resharpened bits. The carriers shown are those used by stope machine men. Those supplied the development machine men have places for ten bits.



"JACKBIT" AND DRILL-ROD THREADS



SHARPENING BITS

By means of this Type J-2 grinder, bits are successively reground until they have been reduced, ⅛ inch at a time, through all gauges from 2⅛ to 1⅝ or 1½ inches.

During the first five months of 1935, a total of 4,824 new 2⅛-inch bits was purchased at an average cost to the mine of $0.2536 per bit. During the same period 27,312 bits were reground —including 966 bits that were upset, or an average of 5.66 bits reground per new bit purchased. During that 5-month period the average bit purchased drilled 36.81 feet, at a per-foot cost of $0.00689, before it was discarded.

In the grinding of the 27,312 bits, 32 forming wheels were used, or one wheel per 853.5 bits ground, at a cost of $0.00811 per bit. When wear has reduced the diameter of the forming wheel to such a point that grinding speed is retarded, the wheel is transferred to the gauging side of the grinder. During the period mentioned in addition to the old forming wheels so used, ten new gauging wheels were put into service, the wheel cost for the combined forming and gauging of the 27,312 bits being $0.01064 per bit.

For tempering, the thread ends of the drill rods are heated to 1,550° to 1,600° F. They are then submerged in 8 inches of fish oil for 30 seconds, after which they are cooled in about ⅝ inch of water. Experience has lessened materially the breakage of thread ends during the removal of bits from them.

The following tabulation compares the average cost experience with drill steel with forged type Carr bits over a 5-year period with that of detachable cross bits over a 5-month period in 1935. A saving of $0.00648 per foot drilled in favor of detachable bits is indicated, being, in this instance, the equivalent of a yearly saving of $2,761.56.

A comparison of the footage drilled per machine shift during the 5-month period in 1935 with that of the 4-year period immediately preceding, indicates an increase of 4.25 feet since the installation of the detachable bits. Physical and operating conditions corresponded closely during the two periods. The increased footage is attributable in part to several conditions, among which are included: less time and effort expended by the drill operator in transporting steel from haulageways to drilling faces; elimination of a tendency on the part of the machine man, because of the greater effort involved in carrying forged steel, to continue its use after efficient cutting and gauge conditions have passed, a practice that results in excessive drill repair cost and increased air consumption; and the general but more or less intangible betterments, including safety, that accompany the handling of less weight of material.

The change from forged bits to detachable bits at the Mascot operation is looked upon as a decided improvement in practice, and it is expected that with added experience further betterments in cost will result.

COMPARATIVE COSTS OF MINING WITH FIXED AND DETACHABLE BITS

	Bits Forged On Steels Five Years' Experience (1927—1931)	Detachable Bits Five Months' Experience (First Half 1935)
Total feet drilled	1,738,171	177,567
	Per Foot of Hole Drilled	Per Foot of Hole Drilled
Steel sharpening (labor)	$0.00809	$0.00635
Drill steel	0.00541	0.00273
Fuel (oil furnace)	0.00125	0.00031
Oil and cyanide	0.00008	0.00008
Steel sharpener (repairs)	0.00143	0.00145
Shop tools and grinding wheels	0.00023	0.00173
Detachable bits	.....	0.00689
Steel transportation (mine)	0.00255	.....
Steel loss	0.00027	0.00007
Drill repairs	0.00933	0.00530
Compressed air (drilling)	0.06345	0.05943
Miscellaneous	0.00072	0.00199
TOTAL	$0.09281	$0.08633

Industry and the Social Security Program

(*Continued from page* 24)

Social Security Act a ticket to over 50 percent of the population of this country to participate almost at will in monies which they did not earn, and which can be made available to them only by a combination of putting the whole country rapidly in debt and by taxing themselves to some extent, but mostly by taxing the balance of the country which doesn't participate in this particular grab, but probably is interested in some of the other special subsidies. When all the country is receiving bounties there is no effective percentage left over to create the income to pay the taxes to pay themselves back. It is at this point where we may find ourselves if the provisions of this act are permitted to stand. It is my opinion, however, that the perilous effects of this act will be early apparent and impel corrective legislation.

Government Spending Of the Taxpayer's Money

(*Continued from page* 20)

We are told that we are having recovery, and in a certain sense we are. There is a shallow sense of it reflected in the sale of retail sales, the sales of automobiles, in consumers' goods, but not in the sales of basic capital goods. In the face of the recovery we have enjoyed, is there any evidence to warrant the assumption that expenditures will fall? As a matter of fact, the records show that they have been rising. .

So that on any score, experience or reason, there is no justification to the conclusion that, given a recovery, the budget will be brought into balance.

Therefore, I conclude that unless the budget of the United States Government is speedily brought into balance, and other measures are taken to prevent a violent credit inflation, the base for which has been created to the very brim and flowing over, which if it starts will do what Josiah Stamp said it would do, blow the roof off the world—unless the budget is brought into balance, and the steps taken requiring terrific courage to prevent another violent credit inflation, I see no reason to believe that we won't experience something approaching a dictatorship and a socialistic regime.

I would not say this, were it not for the fact that other acts of the administration make a complete pattern of a socialistic, Fascistic, or collective state. But when on top of the other things the administration has done, there is superimposed the consequences of an irresponsible, deliberate spending policy, it is difficult to escape the conclusion that if it remains long in power, the Government which you and I have known will be changed and the economic system which we Americans have enjoyed will be tested to its utmost.

It is because of this condition, that we find this peculiar picture of an apparent recovery, and yet a constant number of unemployed. It is because of this condition that we find the unemployed concentrated in the capital goods industries, in those industries that produce lead, zinc, copper, manufacturing equipment, those industries that produce iron, steel of various kinds. For those industries rest upon the use of savings, not necessarily in the production of those things, but in the consumption of them. Those industries rest upon a free capital market where they can obtain the necessary money to install transmission lines, various manufacturing equipment, with which other things can be made for consumption by the individual. Savings are not employed when they are imperiled by acts of government, and in this instance we have a whole series of acts which imperil the security of savings. It is therefore the very acts of the administration itself, which are destroying the thing which the administration alleges it wants, increased employment. The very acts of the administration itself prevent the reemployment of people. When they say, "If savings are not used for the purpose of putting people back to work we must do so-and-so," what they are really saying is, "we are doing these things so that men cannot go back to work in productive private enterprise."

Is that the more abundant life? Don't be seduced by promises. We were seduced once, but let's not permit another seduction. Don't be beguiled by the appearances of recovery, where the natural forces are strong, and we probably will experience during the course of the next few months something which looks like a recovery, but don't be beguiled by it. Don't take counsel of your fears and refrain from expressing your opinion, for this, I hope, is still America, where a man can express his opinion. Insist, rather, upon those things which are necessary to make a system of private enterprise function. Insist upon a sound Federal fiscal policy, for that is the very basis and foundation of confidence, and confidence is the very foundation of a credit system. The word credit itself comes from "credo," "I believe." And our business machine functions on credit. It is the very foundation of the stabilization of currencies. It is the very heart of a stable money.

A sound fiscal policy can be planned, and the objective attained, though more difficult now, infinitely more difficult than two years ago. I cannot say, of my own knowledge, what the cost of the ordinary departments now should be, because the last vestiges of the economy act have been destroyed, but if we assume them to be $3,000,000,000, and if we add to that another $1,000,000,000 which must be liquidated on account of public works obligations already contracted for, and if we appropriate and expend $1,250,000,000 rather than $2,000,000,000, too, for relief, we will have a total expenditure for next year of $5,250,000,000, against which revenue under existing tax laws is estimated to amount to about $3,500,000,000, and if the administration will convert the Reconstruction Finance Corporation into a liquidating agency and convert some of the other Federal credit agencies into liquidating agencies another $1,250,000,000 can be obtained, leaving a gap of $500,000,000.

There was a time when there would have been no gap at all, and that is the tragedy of the whole present situation. This policy of irresponsible spending has now, it seems to me as I look at the figures, made it necessary to impose taxes, not for the purpose of effecting a social and economic change in our country, but for the purpose of balancing the budget, in the amount of about $500,000,000. And those taxes must be levied upon a broad base, somewhat similar to that which is in existence in England.

That is the way in which the administration can, if it has the courage and if it has the determination, bring the budget of the United States into balance, which is, after all, the only protection that the middle class has against its own destruction. It is the very foundation upon which other things necessary to the re-employment of people and to sound recovery may be attained.

There are some who say that this is brutal and inhuman. Is it more brutal, is it more inhuman, to spend for the sake of 10,000,000 at the expense of 126,000,000; is it more inhuman or more brutal to spend a great people into destruction, to destroy the greatest form of government that man has ever created, or is it more human to spend only that amount which is necessary to prevent destitution, and yet to protect 126,000,000 people? Which is the function of government, to destroy all for the sake of a few, or to protect all of its citizens?

The answer to the whole problem rests with you. It will be decided in accordance with whether you have the character and the courage to insist that this thing be done, whether you have the character and the courage to stand upon your own feet, to resist the seductive pleas on the part of government to help you, whether you can say, "I am a rugged individualist."

Wheels of Government

(*Continued from page* 25)

scribing to the code. The court held that the suit brought was a real controversy between the company and its president and stockholders, in denying the government's request for a dismissal of the plea. It was further announced that the Coal Commission is studying the legal possibilities under Section 14 of the Act which would apparently allow the government to refuse to purchase from coal producers who are not under the code. There are indications that prohibitory action with reference to purchase might be extended to the railroads which carry the mails. Of definite interest during the month was the action taken by five of the largest bituminous coal producing companies in announcing their refusal to sign the coal code. It is further understood that there are a large number of smaller companies which will not subscribe to the code.

Under the NRA organization, Industrial Coordinator Major George L. Berry mailed a letter to over five thousand former code executives requesting their reaction to a series of "round table conferences" in discussion of voluntary fair trade practice agreements. During the month, Major Berry also sent a letter to the secretaries of 30,000 labor unions asking for data on wage cuts and hours of work since the termination of the NRA codes. The letter stated that it was felt that information on working hours and wage cuts could best be secured from the representatives of the workmen.

CHARLES ENZIAN has been appointed a member of the State Board of Examiners which will conduct examinations of applicants for appointment as anthracite mine inspectors.

Accuracy of Determinations of SULFUR in COAL SAMPLES

By T. W. GUY*

RECENTLY 15 laboratories have cooperated in making 277 repeat sulfur determinations on a single pulverized sample of coal. The object of this test was to secure data for a study of:

a. The probable limits within which the results of such determinations may be in error.

b. The relative accuracy of different standard methods.

The sample was carefully prepared and sent out by Appalachian Coals, Inc. A quantity was pulverized to approximately 60 mesh. The pulverized sample was carefully divided and a quart can, approximately full, was sent to each of 11 laboratories. They were advised that, in order to avoid possible segregation, the plus 60 mesh material, approximately 11 percent, had not been screened out and recrushed before the pulverized sample was divided for the laboratories. These laboratories reported the results shown in Figure 1 under Nos. 21 to 31, inclusive.

Subsequently, parts of the same sample were sent to other laboratories, and these and a number of the original laboratories made additional tests in multiples of 10, as shown on Figure 1. Fourteen groups, Nos. 1 to 14 on the chart, were made by the Eschka method, and 10 groups, Nos. 41 to 46, and 70 to 72, inclusive, were made on Calorimeter Bomb Washings. In the first sub-group the sulfur was determined as barium sulphate, and in the second group by a Turbidimeter Method developed by H. D. Bowker, chief chemist of the West Virginia Coal and Coke Corporation. Nos. 60 and 61 were determined by Peroxide Bomb Method.

On Figure 1 each group of 10 results is shown with its average represented by a horizontal line, and the individual results in the order of occurrence, represented by dots. A glance at this chart shows that the results of the different methods, in this case, should not be averaged together, as the Calorimeter Bomb Washing results are consistently lower—averaged .09 percent higher than the Eschka results, while the Peroxide Bomb averaged .09 percent higher than the Eschka. In the latter case, with only two groups, the results may not be significant.

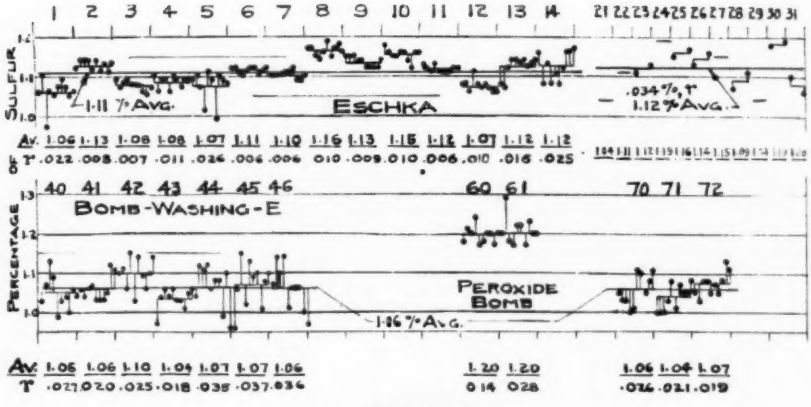


FIGURE 1.
REPEAT SULFUR DETERMINATIONS ON A SINGLE PULVERIZED SAMPLE OF COAL

• INDIVIDUAL RESULT
⌐ GROUP AVERAGE
T PROBABLE ERROR, INDIVIDUAL RESULT FROM GROUP AVERAGE

If we accept the 157 Eschka results, then we take the average of 1.11 percent as the true or correct sulfur for this sample.

It is interesting to note that only 23 results out of the entire 277, or 8 percent, showed the true sulfur. The others range up to 1.29 percent and down to .96 percent.

Five out of 14 groups of 10 Eschka results fall *entirely* above or below 1.11 percent. This indicates that some laboratories, or their individual operators, have small constant errors which make all their results correspondingly too high or too low; and that in such cases the differences between individual results indicate that the results are in error to a much smaller extent than they actually are.

Note: (1) By Peter Formula, $r = .85\frac{\Sigma x}{n}$ where x = the sum of the individual errors and n = the number of results. This formula is sufficiently accurate when n is 30 or more.

(2) By Root Mean Square Formula $r = .6745\sqrt{\frac{\Sigma x^2}{n}}$ where Σx^2 = the sum of the squares of the individual errors or deviations from the average; n = the number of observed values, or results.

Formula (2) is more accurate and should be used when n is small. In this case both methods give r=.0262%. The values given for small groups in this paper are calculated by the latter method.

Measuring the Errors or Deviation of the Results

The difference between the true value, in this case 1.11 percent, and each individual determination is a measure of the *error* or deviation of that determination, thus obviously for the results showing 1.11 percent the error is zero, for those showing 1.10 percent or 1.12 percent the error is .01 percent, etc.

In Table I the Eschka results have been grouped to show the number of results which are in error (differ from the true sulfur) by intervals of .01 percent. We see that 32 results are in error .01 percent, 22 results by .02 percent, etc. In the fourth column we have the products of these numbers, and the *sum* of this column *divided by* the total number of results, 157, gives the *Average Error*, or deviation, from the true value = .0308 percent.

* Consulting Engineer, Charleston, W. Va.

Now multiplying this Average Error by a constant, .85,* we get .0262 percent, which is the numerical value of the Probable Error, r, for the individual sulfur results obtained under the given conditions.

By adding and subtracting this value of r, .0262 percent, from 1.11 percent, the true value in this case, we get 1.136 percent and 1.084 percent as the lr limits, within which we expect approximately 50 percent of all the results to fall.

Then adding and subtracting in turn values of 2r, 3r, and 4r from the average we get the 2r, 3r, and 4r limits, within which we expect approximately 82 percent, 96 percent, and 99 percent, respectively, of the results to fall.

Now checking the actual or observed results with the expected distributions we find good agreement for the Eschka and for the corrected † Bomb Washings shown in Table II.

From the above we see that given the value of r we can predict closely enough for practical purposes the limits above and below the average or true value within which certain percentages of the results will fall; also that the extent of such limits increases directly with the numerical value of r; therefore:

Given the values of r for a number of groups, they may be readily compared as single numbers each of which represents its entire group.

Eschka Results

When r for the individual Eschka results is .0262 percent, then 99 percent of the averages of groups of 10 should fall within .033 percent† of the true value, 1.11 percent. The fact that only 57 percent of the group averages fall within these limits indicates the presence of sources of error which affected the differences between certain groups, but did not affect the differences between individuals of these groups, indicating that while the differences between results of one laboratory may show a low probable error (or a high degree of accuracy from its own average), there is still a strong probability that all the results from that laboratory may be too high or too low.

Values of r are shown on the chart for each group from its own average, but these groups are not large enough to give results sufficiently reliable for comparisons between groups. The average of these values for 14 groups, however, gives .014 percent as a value of r for errors which might be expected for repeat results in a single laboratory by a single operator.

This compares with results published by the British Fuel Research, No. 29,‡ as shown in Table III.

* See Table I.

† Correction of +.05% applied for Constant Error.

† $\sqrt{\frac{4r}{10}} = 1.265r = .033\%$.

‡ Investigation of the Accuracy of Routine Analytical Determinations on Coal and Coke, by Briscoe, Jones & Marson.

§ Correction +.05% Applied.

Table I

Distribution of Individual Errors, or Deviations; and Calculations of the Average Error, and the Probable Error, r
157 *Actual or Observed Results Average Sulfur* 1.11 *Percent*
Eschka Method

Sulfur Results	x Error or Deviation	f Frequency, or No. Results	xf Products
1.11%	00%	17	00
1.10 or 1.12	.01	32	.32
1.09 or 1.13	.02	22	.44
1.08 or 1.14	.03	25	.75
1.07 or 1.15	.04	20	.80
1.06 or 1.16	.05	22	1.10
1.05 or 1.17	.06	8	.48
1.04 or 1.18	.07	5	.35
1.03 or 1.19	.08	3	.24
1.01	.10	1	.10
.99	.12	1	.12
.97	.14	1	.14
Total	...	157	4.84
Average error	.0308	..	.0308=4.84/157
r, the probable error=.85(.0308)=.0262%			

Table II

Within Limits± Average 1.11%	Expected Percentage of Results	Observed Percentage of Results 157 Eschka r=.0262%	Observed Percentage of Results 100 Bomb Washings † r=.0291%
1r	50%	47%	48%
2r	82	84	79
3r	96	96	95
4r	99	99	100
5.7r	99.99	100	...

Table III

	No. Results	Method	Avg. Sul.	r Single Lab Basis	% Results Correct to .01%
This Test	140	Eschka	1.11%	.014	11%
British	64	Eschka	.666	.012	18%
British	64	Eschka	.710	.014	18%
British	64	Eschka	.910	.015	18%
This Test	100	Bomb W.	1.11§	.028	13%

While the above seems to indicate a value of r less than .015 for repeat determinations in a single laboratory by a single operator, the strong probability of small constant errors indicated by this test make it doubtful whether it would be safe to take r for Eschka results from either a single or a group of laboratories at less than .026.

It is interesting to note the small percentages of the repeat samples which showed the correct percentage of sulfur to hundredths.

Bomb Washing Methods

Ten groups of 10 determinations each were made in three laboratories by six or seven different operators. In seven groups the ASTM method was used, and in the groups 70, 71, and 72 the sulfur was determined by the Bowker Turbidmetric method. The two groups show the same average 1.06 percent which is .05 percent lower than the average of 157 Eschka. The 10 groups show values of r from group averages ranging from .018 to .037 percent with an average of .028 percent compared with .0292 percent for the 100 results from the general average.

It is interesting to note that the accuracy of the Bowker method, which I understand is much quicker, corresponds favorably with the standard Bomb Washing.

The two Peroxide Bomb groups 60 and 61 show distribution which compares favorably with the other method, but the average is .09 percent higher than the Eschka.

Conclusions

The results of this test show that:

1. As usual in such tests only a small percentage of the results show the true or average sulfur, the others being distributed according to the laws of probability above and below the average.

2. The number of determinations and the expense necessary to determine the exact percentage of sulfur, even in a single pulverized sample, is of course, prohibitive except as a means of secur-

(*Concluded on page* 37)

The Use of

DETACHABLE DRILL BITS

at Inland Steel Company's Properties

By R. D. SATTERLEY*

THE Greenwood Mine, located near Ishpeming, Marquette County, Mich., is operated by the Inland Steel Company. This mine produces iron ore in the form of hard hematites and magnetites. The principal use of this ore is as a lump ore for open hearth purposes. The ore deposits in this property occur as isolated lenses distributed somewhat as plumbs in a hard iron formation locally known as jasper. The winning of these ores requires a large amount of development work in this very hard formation and also requires the mining of a number of isolated deposits. As originally operated, this property used shop forged bits, and the transportation problem of moving the steel from the shop to these isolated deposits was a considerable item of expense. It was, accordingly, decided by the management to make experiments with detachable bits chiefly for the purpose of eliminating this transportation problem. These experiments have been carried on over the past two years and some definite results have been obtained which will be discussed in this paper.

The shop forged bits as previously used were cross bits with gages ranging from 2⅝ in. on the starter drill to 1⅝ in. on the longest steel with ⅛-in. gage changes for every foot of increase in steel. The drilling speeds with this type of bit in the rock or jasper formation using a 4-in. mounted machine was about 2 in. per minute. The ore consisting of hard hematite and magnetite was drilled with 3-in. mounted machines and the rate of drilling in ore was approximately 3½ in. per minute. Under ordinary circumstances about two contracts with four machines were working continually in rock and about six contracts with 12 machines were working in ore. It will be realized that a very large tonnage of steel was required each day for this rock and ore drilling.

The cost of forging bits on drill steel was nominal as the equipment used was the customary drill shop equipment with the ordinary labor employed in a modern drill sharpening shop. The cost of transportation into and out of the mine and into isolated working places involved a large expense when figured back to the cost of each bit used.

At the time detachable bits were considered for this mine little if anything was known in this district concerning this tool, and the experiments involved pioneering. To our knowledge, none of the mines in the district were employing detachable bits. The experiments on detachable bits were carried on with the idea of determining the following facts concerning their use:

1. The ultimate number of uses of a bit before discard.
2. The increase, if any, in the drilling speed with the use of the detachable bit.
3. The life which could be secured from the threaded end of a drill rod and the cost of threading a drill rod.
4. The saving in drill steel due to detachable bits.
5. A comparison of the total cost of drilling with the forged bit as compared with the cost of drilling with the detachable bit.

As the experiments progressed a further factor appeared and this was the possibility of using smaller machines with smaller bits to accomplish the same results.

The first experimental work with detachable bits was discouraging. These bits were new to our operation and to the manufacturers and many imperfections were found. The manufacturers cooperated with us in this work and as fast as we discovered these imperfections they were corrected and the bits were rapidly improved. Since our experiments on detachable bits were begun other operators in this district have started to use them and several manufacturers are working on these bits. It has been found that the detachable bit can be greatly improved by improving the quality of steel used in it. Originally these detachable bits were of the same material as the rods which were formerly forged to make shop forged bits. It has been found that the bits can be made of higher carbon steel than that used in the drill rods which results in a harder temper and a longer drilling life. The steel in the rod from which the shop forged bit is made is selected for a combination of fatigue resistance in the rod and the cutting edge in the bit. The detachable bit allows the separation of the two characteristics above mentioned and it is, therefore, desirable to have the character of the steel in the bit different from that in the rod. It is our belief that further progress can be made in this direction by the use of special steels and alloys, and that continual improvement in the detachable bit can be made on account of the quality of steel used.

The second difficulty experienced with the use of these bits was the matter of regrinding. We found no satisfactory equipment on the market for regrinding bits, and it was necessary for us to work along with the manufacturers of grinding equipment to secure machines which would handle this work. This involved experiments as to the machines and also as to the grinding medium to be used. Many grinding wheels were used before a satisfactory grade of material was secured. The type of grinding machine finally selected was a wet grinder with two wheels, one wheel for grinding the cutting edges and one wheel for grinding the gage. The cutting edge is ground with a V-shaped wheel grinding two faces at the same time. The gage is ground by revolving the bit against a flat wheel.

The cost of grinding at first was excessive, but after the machine and grinding wheel were perfected this cost was finally brought down to a reasonable basis. The cost of grinding as now carried on is 5 cents per bit which includes all labor and supplies. Our experiments indicate that it may be possible to make a grinder which will further increase the grinding speed and decrease the cost. We believe that a machine can be developed which will grind several bits in one operation. Our facilities do not permit the development of this machine and this will probably have to await a more general use of detachable bits to interest the manufacturers in this undertaking.

A third difficulty encountered in the use of detachable bits was the matter of

* Supt., Greenwood Mine, Ishpeming, Mich.

educating the miners to their use. It was difficult to teach them to screw the bit on properly so as to make a contact between the bottom of the bit and the end of the rod. If this contact were not made the burden of the work rested on the threads and this resulted at first in many broken threads and in the stripping of the threaded end of the rod. Another difficulty was to educate the men into frequent changing of bits so that they would not become dull. The efficiency of a sharp bit is very much greater than a dull bit and inasmuch as transportation is no item with these bits it is cheaper to change frequently. The habit of drilling with shop forged bits until they were very dull had been firmly fixed in the minds of the miners and it was difficult to get them out of this habit.

Our experiments have now shown at the Greenwood Mine that a new bit will have a total of from six to seven uses before being discarded. We have been able to regrind the bit three times at which point the face of the bit is worn down below the factory temper. The bit is then reground and retempered in our oil burning muffle furnace. These bits in the retempering process are quenched by standing the cutting edge of the bit on a screen through which the water bubbles giving a depth of water of approximately ⅝ in. on the screen. After the bit has been retempered it may be reground twice more before it is finally discarded. We then have the bit used as follows: first in its new condition, then with three regrinds; it is again reground and retempered and can be reground twice more making a total of six uses for the bit before discard.

The cutting properties of the detachable bit are much greater than those of the shop forged bit. A summary of the results of our experiments has shown that the detachable bit will show a 40 percent increase in drilling footage over the shop forged bit. The following data will indicate this increase in drilling speed:

3-in. machine using 1¼-in. round hollow steel with shop bits—3.46 in. per min.
3-in. machine using 1¼-in. round hollow steel with detachable bits—4.75 in. per min.
3-in. tappet machine using 1-in. hexagon steel with detachable bits—5.21 in. per min.

This large increase in drilling footage has resulted in several important savings; first, in the saving on the cost of bits; second, in saving in transportation charge; third, in saving on drill machine repair cost; fourth, material reduction in air consumption; fifth, saving in the use of smaller machines; sixth, saving in the use of smaller drill steel. It has been found in this connection that the best results in ore are obtained by using 1-in. hexagon steel with a smaller bit than with using 1¼-in. round steel with a larger bit.

When we first began the use of detachable bits the threads on the drill rods were made on a lathe and the rods were heat treated in an ordinary oil burning drill furnace without pyrometer control. This method of thread making was found to be slow and costly and the heat treatment was not sufficiently uniform which resulted in excessive breakage in the threaded end of the rod. Dies were purchased for our bolt threading machine and this machine was used to cut the threads on the rods. The rods were first sized to the proper diameter in the drill sharpener, then annealed in lime or mica and the threads were then easily and cheaply cut with the bolt threading machine. A muffle oil furnace was purchased having pyrometer control which gave accurate temperature control. This furnace was used satisfactorily for heating the rods before tempering. The cost of conditioning and threading the rods for detachable bits has now been reduced to 3 cents per run of each bit. This cost includes labor and supplies used in the shanking and threading of the rods. The average life of a threaded end of a rod using detachable bits is from 250 to 300 minutes of drilling.

No. of Bits	No. of Regrinds	Cost		Total Cost
1,000	New	27 cents		$270.00
1,000	1 regrind	5 cents		50.00
*933	2 regrind	5 cents		46.65
*867	3 regrind	5 cents		43.35
*800	4 regrind and temper	7 cents	2 cents retemper	56.00
*400	5 regrind	5 cents		20.00
5,000	6 uses			$486.00

* The loss on regrind was caused by breakage and loss in transportation.

The cost of drill steel purchased in order to keep the mine adequately supplied with rods has decreased 33 1/3 percent since the use of detachable bits. The better cutting condition of the bit reduces the fatigue in drill rods materially reducing breakage. There is also a saving in steel through the decrease in the number of times a piece of steel is heated. With the shop forged bit the end of the steel is heated each time the bit is forged, while with the detachable bits a single threading will last out many bits. This continual heating of drill steel causes serious deterioration loss.

An efficiency engineer was employed at the Greenwood to supervise experiments on detachable bits and much data were collected for use in the comparison of cost between the shop forged bits and the detachable bits. The following is a general summary of this cost data.

Shop Forged Bits

The cost of shop forged bits including sharpening, loss of steel, and transportation at this property was 26.4 cents per bit used.

Detachable Bits

The following is the cost of the use of detachable bits is shown in the table above.

The average cost per detachable bit run is 9.72 cents.

The total cost of using detachable bits is then as follows:

	Cents
Cost of each run of bit	9.72
Cost of conditioning rods per run of bit	3.00
Loss of steel per run of bit	2.40
Total cost	15.12

From these figures it will be noted that there is a saving of approximately 11 cents per bit for the detachable bits over the shop forged bits.

The use of the detachable bits at the Greenwood property has been satisfactory and has resulted in greater drilling efficiency and lower costs. The advantages of the detachable bit as shown by our experiments at this property are as follows:

1. A saving of 11 cents in the cost per bit used.
2. An increased drilling speed of approximately 40 percent.
3. A saving in drill steel of approximately 33 1/3 percent.
4. The use of smaller bits and the drilling of smaller holes resulting in material increase in drilling efficiency.
5. The use of smaller drill steel and lighter machines resulting in smaller repair costs and decrease in air consumption.

Determining Sulfur In Coal Samples

(*Continued from page* 35)

ing data as to what degree of accuracy is practicable, and what allowance should be made in accepting the results of a sample as giving the sulfur in a given lot of coal.

3. The same number of results from different laboratories, or by different operators generally gave averages much closer to the true sulfur than the results from one laboratory or by one operator. This has been observed also in ash tests.

4. We can say of a random result on this coal from the laboratories and operators making these determinations that:

There are 99 in 100 chances that an Eschka result will be in error less than	.105%
and 50 in 100 chances less than	.026%
There are 99 in 100 chances that a corrected Bomb W. result will be in error less than	.116%
and 50 in 100 chances less than	.0292%

There will be 1 in 100 chances that any result is higher or lower than the true sulfur in the pulverized sample by more than .105 percent or .116 percent, respectively.

This makes no allowance for the probability that the pulverized laboratory sample contained more or less sulfur than the lot of coal from which it originated.

Proposed Standard Methods for Testing MINE FANS

By: J. F. MacWILLIAMS*
R. R. ROBINSON†

IN ORDER to compile information on performance of various types of mine fans it is recommended that the specifications set up by the English Institute of Mining Engineers be temporarily adopted and that the committees of the American Mining Congress should make any modifications in these specifications that would be desirable in conforming to American practice. We should have standard methods of testing fans and mine ventilation as otherwise comparisons to determine the efficiency of various types of fans and ventilation practice cannot be made.

The effect of natural ventilation is something that must be taken into account and it is my belief that tests over a period of at least one year will be required to set up proper corrections in the cases illustrated by figures 1, 2, and 3. Corrections must be made to obtain the actual work done by the fan, because in case of natural ventilation causing air to flow in the same direction as the fan, the volume will be greater but since the fan has to pass the total, the friction loss through the fan becomes greater.

Three tests would probably give valuable information. First, one with the intake 30° F. below the uptake; second, both at the same temperature; third, with the intake 30° F. above the uptake. Upon checking the velocity of the air leaving the top of a number of chimneys, it was found that none of those checked had uniform flow; velocities varied from 7,000 ft. per min. positive to 500 ft. per min. negative. Also there were variations from positive flow at the outside edge of stack to negative at the side next the cut off.

With a velocity of 4,000 ft. per min. or 1" water gage and 200,000 cu. ft. per min., the horse power for discharge would be about 30. If the stack is properly designed and the flow velocity reduced to 1,000 ft. per min., about 28 h.-p. would be available for producing more flow through the suction side of an exhaust fan. The result would be the same flow at less horse power input or increased flow at the same horse power input. Here again a specified method of measuring the velocity at the top of the stack should be laid down. Tests should be made at the junction of the fan and mine. To determine the losses in the fan itself, pressure readings should be taken back of the wheel. The correct way to take such pressure readings is laid down in the English specifications.

In purchasing a new fan, let the manufacturer make his own tests to determine the equivalent orifice of the mine. Install the fan, but not hood over shaft. Cut a hole in a thin sheet to equal the equivalent orifice of the mine and run performance tests. In this case corrections as to effect of natural ventilation will not have to be made.

In conclusion, I wish to state: Due to lack of opportunity to make sufficient tests, I would not at this time attempt to give any opinion of corrections to be made in cases of natural ventilation.

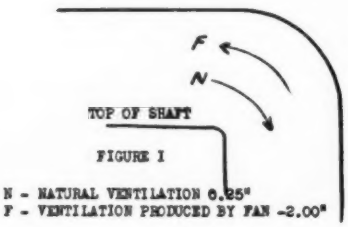


FIGURE I

N - NATURAL VENTILATION 0.25"
F - VENTILATION PRODUCED BY FAN -2.00"

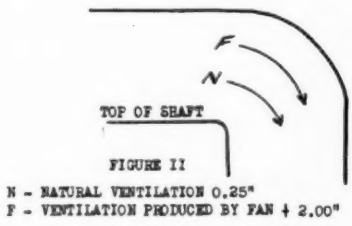


FIGURE II

N - NATURAL VENTILATION 0.25"
F - VENTILATION PRODUCED BY FAN + 2.00"

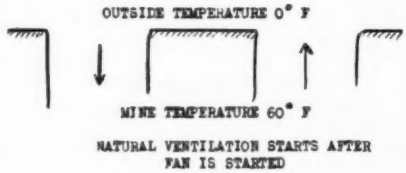


FIGURE III

NATURAL VENTILATION STARTS AFTER FAN IS STARTED

Discussion by R. R. Robinson

IT HAS been my experience that the usual methods of taking velocity readings in mines have been very inaccurate. It is the usual custom to take one center reading in an air course or, at the most, five readings, one in each corner and one in the center of the air course, and to use the average of these readings as the velocity which is employed in calculating the volume. For a number of years the men with whom I am associated have been taking velocity observations in the following manner:

A light board frame is built so that it forms a rectangle with the sides of the rectangle being against the sides, roof, and floor of the airway. To this board frame is attached string or fine wire, stretched parallel with the sides of the frame and at right angles to the air stream, in such a way as to form small rectangles with approximately 1½ sq. ft. area each.

The anemometer is held in each one of these rectangles, and is passed continuously from one to the next until the entire area is covered. The total reading on the dial of the anemometer is then divided by the total number of minutes consumed during the reading to obtain the velocity in feet per minute. To this result the calibration of the anemometer is applied.

In taking the readings a definite time, usually five seconds, is employed in each small rectangle. The results obtained in the manner just described, compared with those obtained by taking one to five readings, will show a velocity from 10 to 20 percent lower.

The water gauge readings are taken in the air shaft or drift at a point where the air is flowing with comparatively low turbulence. Sometimes this requires an extension pipe 30 ft. long, the end being

* Pennsylvania Coal & Coke Co.
† Robinson Ventilating Co.

Presented to the joint meeting of the Operators Committees of the American Mining Congress, held at Penn State College, October 4th and 5th, 1935.

equipped with a "T" opening at right angle to the air stream. Another reading is then taken at the fan intake if fan is exhausting, or outlet if fan is blowing. The first water gauge reading indicates the true mine resistance while the second reading indicates the resistance the fan must overcome.

Mr. MacWilliams shows in his charts the effect of stack draft or pressure which is created by the difference in weight of the air within the mine and that of the atmosphere. He cites a temperature of 60° underground and 0° F. in the atmosphere. There is considerable difference in the weight of air at 0° and that of the air at 60°. The weight of dry air varies inversely as the absolute temperature, so that a cubic foot of dry air at zero as compared with the same volume at 60° F. would be in weight as 460 + 60 is to 460 + 0; the result being 1.13 to 1.

Now, for purposes of illustration, let us assume that we have an intake air shaft 100 ft. deep and an outlet air shaft 100 ft. deep with the atmospheric ends of these shafts at the same sea level elevation. And suppose that these shafts are 12′ x 12′, or 144 sq. ft. cross sectional area. We would then have a column of air in each which would contain approximately 14,400 cu. ft. If the air in one shaft had a temperature of zero degrees it would weigh approximately 1,242 lbs. If, in the other shaft, it had a temperature of 60° it would weigh approximately 1,100 lbs. so that there would be approximately 142 lbs. difference in the weight of the two columns. This condition could exist, of course, only when the air remained at the two respective temperatures. If the two columns were started in motion there would then be a tendency for the air entering one shaft to change in temperature. At some place in the mine it would acquire a temperature of 60°. Thus, while the fan is in operation exerting a mechanical energy on the air, there would always be the unbalanced condition shown by the figures 1,242 and 1,100.

If the tops of the shaft had a difference in elevation of 100 ft., and they were both of the same depth, we would then have a stack draft which could be calculated by the formula:

$$V = 480\sqrt{\frac{100'\,(60° - 0}{460 + 0}} = 1730' \text{ per min.}$$

In which 100 ft. = difference in elevation of two shafts.
60 = temperature of mine air.
0 = temperature of outside air.
460 = absolute zero.

A velocity of 1,730 would furnish a dynamic head of approximately .188″. This may not be fully effective in increasing or decreasing the volume of air handled by the fan, since some of it will be used in overcoming resistance of the air shaft. However, the stack draft is a factor which must be taken into consideration in all mine fan applications.

Now, the inaccuracy in the reading of air volumes is the most noticeable factor in fan application. Suppose that a specification is written for 100,000 cu. ft. at 4″ W.G. pressure. The equivalent orifice for such a condition would be 20 sq. ft. Suppose that a fan is designed to work at its best point of rating, or at 100 percent to coincide with an E. O. of 20 sq. ft. Now, if the observations which determine the volume, were taken in the usual method, the true volume would, most likely, be approximately 80,000 cu. ft., and the fan would be required to meet an E. O. of 16 sq. ft. or only 80 percent of that which was specified, at which point the efficiency of the type of fan which the figure represents would be 71 percent instead of 73 percent. If the volume had been "under-read," so that the true volume should be 120,000, then the E. O. would be 120 percent of 20 sq. ft. or 24 sq. ft., and the fan would be operating at a point on its curve which would allow it to have an efficiency of about 71 percent instead of 73 percent.

One may say that such a slight drop in efficiency is not a serious factor, but when we consider another factor in fan performance, namely the ratio of the rim speed of the fan wheel to the potential air speed due to the pressure, this variation in E. O. requires a change in fan speed. In the first case, where the volume of air was actually only 80,000 cu. ft., it would be necessary to speed up the fan in order to get the full volume required, and this volume would then pass at 6.25-in. pressure and require 150 instead of 85 brake horsepower. In the second case, it would be necessary to reduce the speed of the fan in order to get the desired volume, and the pressure required would be 2.76 in. while the brake horsepower would be 62. In each case the change of speed does not change the efficiency and, consequently, the operator may pay for more power than was anticipated. It must be remembered that the mine orifice cannot be changed by changing the speed of the fan. In order that highly efficient fans be applied to mines, the true characteristics of the mine must be obtained by careful observations and a fan of the proper size and characteristics applied.

Problems of Federal Taxation

(*Continued from page* 16)

penditures? Conveniently classified they were as shown in Table IV.

It is true that for the fiscal year 1936, the appropriations for Federal Emergency Relief have been greatly reduced, but this is more than offset by the great expansion in the public works program.

In any regular budget for the future, we must include a reasonable sinking fund. Accordingly, more than $2,500,000,000 must be eliminated, using the 1936 budget as a starting point, in order to bring our average future expenditures down to $6,500,000,000.

I have not mentioned the enormous tax burden and corresponding expenditures provided for in the Social Security Act, which will eventually amount to as much as $2,500,000,000 annually. Nor have I referred to local taxes. At the present time the States and local subdivisions collect about $6,000,000,000 annually in taxes. If the Federal Government raises the revenue to $6,500,000,000, then the total tax burden will be $12,500,000,000 or almost exactly $100 per capita.

And now I ask again:

(1) Do you want a federal sales tax, drafted to produce $500,000,000?

(2) Do you want to collect $1,000,000,000 from the small income earners, on the basis of the British system?

(3) Do you want to continue the senseless severities and unnecessary inequities of the present law?

You must answer affirmatively each of these questions if you decide to support a $6,500,000,000 budget.

TABLE IV

Agricultural Adjustment Administration	$150,400,000
Farm Credit Administration	111,800,000
Federal Land Banks	46,100,000
Federal Emergency Relief Administration	1,315,300,000
Civil Work Administration	11,300,000
Emergency Conservation Work	435,500,000
Department of Agriculture—Relief	80,600,000
Public Works (Tennessee Valley, Boulder Canyon, Public Highways, Loans to States and municipalities, etc.)	1,061,200,000
Federal Savings and Loan Associations	29,500,000
Emergency Housing and Resettlement	8,200,000
Reconstruction Finance Corporation	391,700,000
Federal Deposit Insurance Corporation	500,000
Administration for Industrial Recovery	12,500,000
Total	$3,654,600,000

Operators Committees Begin Project Reports

THE Operators Committees of the American Mining Congress have started to prepare a series of reports covering the best practices used in every coal field of the United States. The group of men who make up these committees are the operating officials of more than 200 of the most progressive coal companies and their willingness to cooperate in a movement of this kind is conclusive evidence of their belief that this work will do much toward advancing the technique of coal mining and toward reducing costs and bettering safety and working conditions underground.

Reports are to be made by district committees—each committee representing one of the principal coal mining fields—and their reports are to cover practices in their district. These district reports are then to be compiled into national reports and this compilation will be made through National Project Committees. There are eight National Project Committees each covering one phase of mine operation such as face preparatory work, loading, transportation, power, mine maintenance, mining systems, surface preparation, and safety.

A joint conference of the Project Committees was held at Penn State College on October 4 and 5, 1935. At this meeting each Project Committee submitted the subjects which they recommended under their project. These recommendations were discussed by the meeting as a whole and with some changes were formally approved by a vote of those present. The following list shows the subjects adopted.

The purpose of preparing this list is to have all District Committees compile reports on the same subject, as far as it is possible to do this. In submitting five subjects under each of the eight major projects, it is not the intent that the districts should make reports on each of the five subjects listed under each project, but to take only the subjects marked No. 1. The subjects listed as Nos. 2, 3, etc., are alternates and reports on these are to be made by a district after their report on No. 1 is completed or if there can be no data gathered on No. 1 in their district.

All the District Committees are to start immediately on these reports. Each District Committee is organized with eight subcommittees—one covering each of the major projects, such as face preparatory, loading, transportation, etc. A subcommittee is to compile a report on one subject only, but each district as a whole through its eight subcommittees will report on eight separate projects. Under this plan all District Committees—15 in number, and including all of the principal coal producing fields—will be working simultaneously on reports covering the same subjects.

As soon as a project report has been completed by a District Subcommittee it is to be approved by the District Committee as a whole. After such approval it is then to be sent to the Washington office of the American Mining Congress, and from there it will be forwarded to the proper national project chairman who will then combine the district reports into national reports.

Subjects for National Reports

Face Preparatory Work

1. Cutting Bit Treatment—material, design, sharpening, tipping.
2. Cutting Out Partings and Impurities by Machine.
3. Drilling Bits—including material, design, sharpening.
4. Blasting Practice—including methods and materials for tamping.
5. Preparation of Coal at the Face—to improve quality and size.

Transportation

1. Gathering Haulage
   (a) From face to room neck.
   (b) From room neck to the parting.
   (Note: Combine (a) and (b) where haulage is continuous from face to parting.)
2. Gathering Side Tracks or Partings—layout and operation.
3. Secondary or Intermediate Haulage Methods.
4. Main Line Haulage—equipment and operation.
5. Control and Dispatching of Trips.

Surface Preparation

1. De-watering Sizes Smaller than 1½ inches.
2. Drying Sizes Smaller than 1½ inches.
3. Dedusting
   (a) Screens, Air Methods or Combination of Both.
   (b) By Oil or Chemical Treatment.
4. Efficient Screen Separation Between 10 Mesh and 1¼-inch inclusive.
5. Percentages of Under-size and Over-size Productions in Crushing a Given Feed to a Required Size.

Safety

1. Safety Education and Activities between Mine Officials and between the Officials and Workmen.
2. Safety Clothing and Equipment—including hats, caps, shoes, leg shields, goggles, and gloves.
3. Requirements for Timbering Working Places Including Safety Posts.
4. Guarding Trolley Wires, Feeder Lines and Other Power Mining Equipment.
5. Methods and Practices of Transporting Men Including Drivers, Motormen, Brakemen, and any Others Working or Traveling Haulage Roads.

Mechanical Loading

1. Slate handling at face in connection with mechanical loading.
2. Complete cycle of a mechanical loading operation, showing sequence and time for all operations.

Conveyor Mining

1. Time studies to determine efficient cycle for face operations.
2. Method of moving conveyors from one location to another.
3. Control and distribution of power from switchboard at the mine car loading point to the equipment at the face.

Hand Loading

1. Methods for multiple shifting hand loaders.
2. Tonnage mined per loader as effected by preparatory work performed by the company, such as drilling, shooting, slate handling, etc.

Power

1. Selecting Proper Size of Conductors for D. C. Supply.
2. Converting Equipment and its Relation to Mine Operation.
3. Location of Source of Power as Related to Operation.
4. Protective Electrical Equipment Underground.
5. Power Costs Reduction Methods in Mining.

Mining Systems

1. How can Present Mining Systems be Rearranged to Concentrate and Facilitate Production?
2. Possibility of Using Longface Mining in Thin Seams.
3. Relation Between Percentage of Coal Recovery to the System of Mining.
4. Methods of Room Pillar Recovery.
5. Is There any Other than the Room and Pillar System More Suitable to Conveyor Mining?

Mine Maintenance

1. Methods for Determining the Effectiveness of Mine Fans.
2. Main Heading Roof Support Using Three Piece Sets.
3. Methods Used in Overcoming the Injurious Effect of Impure Mine Water on Pumps and Pipe Lines.
4. Methods Used in Controlling Air Volumes by Air Locks, Automatic Doors, etc.

PERSONALS

J. R. Hobbins, vice president in charge of western operations of the Anaconda Copper Mining Company, is now at the New York offices of his company.

Edward L. Ryerson, Jr., is now vice chairman of the board of directors, Inland Steel Company, Chicago, Ill.

C. F. Biggert, in charge of steel mills and iron and coal mines of the International Harvester Company, Chicago, Ill., has announced that the company will immediately expend $2,250,000 on improvements to its South Chicago plants and its subsidiary, the Wisconsin Steel Works.

Julian Boyd, president, The Mining Association of the Southwest, Los Angeles, Calif., has been elected president of the Los Angeles Engineering Council of Founder Societies (Civils, Miners, Electrical and Mechanical) for the year 1935-36. Some 2,000 engineers comprise the membership of these four societies in the Los Angeles district. The annual dinner of the Council was held on October 30.

Ralph E. Taggart was given a special luncheon by officials of the Philadelphia & Reading Coal & Iron Corporation and the Philadelphia & Reading Coal & Iron Company, inducting him into his new office as president. Nathan Hayward, the retiring temporary head of the P & R, acted as toastmaster, and the executive and operating staffs of the company were present.

Clarence B. Randall, vice president in charge of raw materials and lake freighters, Inland Steel Company, has been elected a director of the company.

W. M. Black has been elected vice president in charge of sales of the American Manganese Steel Company, Chicago Heights, Ill.

Tasker L. Oddie, former Senator from Nevada, speaking before a mining meeting in California recently, predicted a world gold price of $41.34 an ounce.

Ira B. Joraleman, who has been spending some time in Alaska on professional work, has returned to his San Francisco office.

Wilbur H. Grant, well-known consulting engineer, of California, has been examining Colorado mining properties.

T. J. O'Brien, Kemmerer Coal Company, has been elected president of the Southern Wyoming Coal Operators Association.

John W. Sands, of Wheeling, W. Va., was recently elected president of the Hitchman Coal & Coke Company.

Frank H. Wigton, president, Morrisdale Coal Company, is recuperating from a serious illness.

John E. Nelson, manager of northern ore mines, Republic Steel Corporation, has been appointed manager of the combined Republic mines and the mining properties of the former Corrigan, McKinney Steel Company, with headquarters in Duluth, Minn. He will have charge of a total of 11 active mines in Michigan and Minnesota.

W. G. Swart, mining engineer, Alameda, Calif., is on a professional trip to Idaho.

Eugene H. Merrill, engineer, U. S. Smelting Refining & Mining Company, Salt Lake City, Utah, has been appointed chief engineer of the Utah State Public Service Commission.

Donald B. Gillies, president, Corrigan, McKinney Steel Company, Cleveland, Ohio, was elected vice president and director of the Republic Steel Corporation when the two companies were merged on September 23.

Geo. B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago, was toastmaster at the first annual banquet of the American Bituminous Retailers Association, at the Stevens Hotel, Chicago, September 30. **Senator Joseph F. Guffey** was the chief speaker at the banquet. Important addresses were made to the convention by **Howard N. Eavenson**, president, Clover Splint Coal Company, Pittsburgh; **Hubert E. Howard**, president, Binkley Coal Company, Chicago; **Carroll B. Huntress**, president, Appalachian Coals, Inc., Cincinnati; and **W. E. E. Koepler**, secretary, Pocahontas Operators Association, Bluefield, W. Va.

George S. Rice, chief mining engineer, U. S. Bureau of Mines, Washington, D. C., sailed for Europe on August 28 to participate in the international conference on mining research at Dortmund, Germany, September 23-28. Mr. Rice will also attend the Seventh International Congress of Mining, Metallurgy and Applied Geology, in Paris, October 21-26, returning to this country about November 15.

Geo. Martinson, chief safety inspector of Minnesota mines for Pickands, Mather & Company, has been transferred to Cleveland, where he will be assistant to H. C. Jackson, in charge of the safety department of the company. **C. E. Heger** has been appointed to the position formerly held by Mr. Martinson.

A. J. McDermid, for so many years affiliated with the Miami Copper Company, has transferred his headquarters to New York, where he is serving as assayer of precious metals in the Government assay office.

Dr. Walter R. Ingalls, director of the American Bureau of Metal Statistics, will discuss "The Economics of Old Metals" at the dinner meeting of the Mining & Metallurgical Society of America, to be held at Columbia University Club, November 12. Francis H. Brownell, chairman, American Smelting & Refining Company, and Benno Elkan, vice president, International Minerals and Metals Corporation, will be guest speakers.

Wm. Loeb, vice president, American Smelting & Refining Company, is confined to a New York hospital for medical attention.

Marcus J. Aurelius, Colorado Fuel & Iron Company, is in charge of the recently opened Chicago office of the company which is being reorganized. This company has been operating under Section 77-B of Federal Bankruptcy Act and it is anticipated that bankruptcy proceedings will soon be lifted.

B. T. Manley, executive secretary of the Utah Coal Operators Association, has been appointed acting deputy in charge of the administration of the Guffey Coal Act in District No. 20. Mr. Manley recently appeared before Examiner Weems, protesting against an increase in intrastate rates on coal.

Louis Ware has been elected president of the United Electric Coal Company, operating strip mines in the southern Illinois district.

Effective November 15, **Barton R. Gebhart** will become affiliated with the Chicago, Wilmington & Franklin Coal Company, Chicago, Ill., in the capacity of vice president in charge of sales. Mr. Gebhart was formerly assistant to the president, Appalachian Coals, Inc., Cincinnati, Ohio.

Among recent callers at the Washington office of the American Mining Congress were **Leo Hoban** and **Arthur Pallette**, of the Hecla Mining Co., Wallace, Idaho; **James Prendergast**, of the Susquehanna Collieries Company; **Louis S. Cates**, president, Phelps-Dodge Corporation; **Paul Weir**, of Bell & Zoller Coal & Mining Company; **Eugene McAuliffe**, Union Pacific Coal Company; **Erle V. Daveler**, of the Utah Copper Company; **Mark Egan**, of the Cleveland Convention and Visitors' Bureau; and **A. B. Parsons**, secretary, American Institute of Mining and Metallurgical Engineers, New York, N. Y.

John L. Tierney has been elected president and general manager of the Powhatan Coal and Coke Company, at Powhatan, W. Va.

MINING EVENTS

THE annual fall meeting of the coal division of the American Institute of Mining and Metallurgical Engineers was held at St. Louis, Mo., October 28-29, 1935. John T. Ryan, Mine Safety Appliances Company, is chairman of the division. He was assisted by a group of coal men and mining school officials in the development of the program, which consisted of a one day's session and a trip to mining properties in the southern Illinois coal field.

WHILE the coal industry has been very active with meetings of various groups, possibly the most important subject before the industry is the development of the organization under the Guffey Coal Control Law and the action of the Courts, which will determine the constitutionality of this Act. The National Bituminous Coal Commission on October 9, 1935, issued orders putting the Guffey Coal Act into operation. Three orders were issued for the promulgation of the code for the soft coal industry, providing for the manner and the form of acceptance of the code by mine operators, and providing a plan for the calling by mine operators of district meetings for the organization of district boards. The Commission named 23 acting deputy district secretaries to organize the district boards. They are to serve without compensation, and rapid progress has been made in the selection of the boards. However, five of the country's principal coal producers refused to sign the code. These companies are the Pittsburgh Coal Company, the Consolidation Coal Company, the Pocahontas Fuel Co., the Berwind-White Coal & Mining Company, and the Island Creek Coal Company, each an important factor in bituminous coal production. The Act provides for a tax of 15 per cent of the sales price beginning November 1. For those complying with the code, 13½ percent will be returned. Companies signing the agreement obligate themselves to operate under its provisions for four years whether the U. S. Supreme Court declares the Act unconstitutional, or not. The dissenting companies, it is said, preferred to await the outcome of the Carter Coal Company case which was considered by the District of Columbia Supreme Court October 29 and 31, and upon which the decision was in favor of the Government.

Another attack on the validity of the Guffey Act began October 26 in the Federal District Court at Louisville in the case of R. C. Tway and 15 other coal companies against the Bituminous Coal Conservation Act. Commissioner Chas. F. Hosford, Jr., of Pittsburgh, recently announced that in spite of the determination of the important coal producers to sign the code that the commissioin will go forward with enforcement and protect to the fullest extent those companies which wish to comply with the code authority.

THE Coal Mining Institute of America will hold its annual meeting December 12-13, at the Fort Pitt Hotel, Pittsburgh, Pa.

THE REORGANIZATION PLAN of the Consolidation Coal Company now has become effective. Steps to make it effective and to issue new securities are under way. Howard Bruce, chairman of the reorganization group, recently announced that the necessary transfers will be made early in December. The new company will be incorporated under the laws of Delaware and will acquire all the assets of the old company.

THE forty-third annual meeting of the Illinois Mining Institute was held at the Hotel Abraham Lincoln, Springfield, Ill., November 8. The meeting was under the direction of Mr. C. J. Sandoe, as president of the Institute; Mr. T. J. Thomas, and B. E. Schonthal. An interesting program was arranged. Mr. George B. Harrington, president, Chicago, Wilmington & Franklin Coal Company, served as toastmaster at the annual dinner, and J. D. A. Morrow, president, Pittsburgh Coal Company, made the principal address.

HAPPY DAZE IS HERE AGAIN

—The Washington Post.

J. J. FORBES, engineer for the United States Bureau of Mines, recently presented to the Detroit Industrial City Council some interesting results obtained through the first aid courses for miners sponsored by the United States Bureau of Mines. He stated that from the year 1910 to 1935, 832,245 first-aid certificates were issued by the Bureau to as many miners and oil workers showing that they had completed the prescribed safety course and were qualified to administer first aid in accident emergencies. The Bureau's course on safety includes instruction in caring for the injured, methods of respiration, control of breathing, dressings for open wounds and for fractures and dislocations, and transportation for the injured.

INTERESTING figures of United States Bureau of Mines showing direct compensation and medical costs per ton of coal mined have been released. Wyoming costs for a five-year period were 2.37 cents. Pennsylvania bituminous 2.93 cents; Virginia, four-year period 3.6 cents; Colorado, five-year period, 5.1 cents; Tennessee, five-year period 5.21 cents; Utah, 11-year period 5.3 cents; Pennsylvania anthracite, five-year period 5.43 cents; Indiana, two-year period 6.6 cents; Washington, three-year period 9.4 cents.

WALTER W. BRADLEY, state mineralogist for California, recently released his report on California's mineral industry in 1934, which shows a total value for the year of $237,374,709,000, being an increase of $30,885,651 over 1933. The state produced 59 different mineral substances, and 48 counties produced minerals. California produces petroleum, gold, borates, cement, stone, silver, mineral water, quicksilver, tungsten, diatomite, brick, natural gas, copper, potash and limestone.

THE International Acetylene Association will hold its thirty-sixth annual meeting in Cleveland, Ohio, November 12-15, inclusive. They anticipate an attendance of more than three thousand. A most interesting program will be presented. Mr. Merle Thorpe, Editor of Nation's Business, will be the keynote speaker, and his address will be broadcast over a nation-wide radio hook-up.

"ANTHRACITE WEEK" was celebrated during the week of October 6-12, by the people of the anthracite region. The sponsors of the movement were the Chambers of Commerce of Scranton, Wilkes-Barre, Hazleton, and Pottsville. Wholehearted cooperation was given by the newspapers, coal companies, merchants, and the people in general. The aims of the sponsors of the movement were to acquaint the people of the anthracite region with the problems faced by the industry both in home and outside markets and to secure their enthusiastic cooperation in solving these problems. The high point of the week

was a giant mass meeting on Thursday night in the Masonic Temple, Scranton. Principal speakers were Walter Gordon Merritt, counsel for the Anthracite Institute; Frank C. Walker, director of the National Relief Council; Colonel Ernest G. Smith, publisher of the Wilkes-Barre Times-Leader; D. W. Davis, representing the U. M. W. of America; and J. F. W. Heinbokel, general chairman of the anthracite week committee, Scranton Chamber of Commerce. Modern anthracite burning equipment was prominently displayed in all cities in the region and speakers stressed the utilization of anthracite stokers to stem the tide of competitive fuels.

WORLD COPPER metal surplus was reduced by 18,300 net tons in September. The surplus, however, still remains at about 532,000 tons.

MINING of iron ore and coal and quarry and limestone consumed by these companies required an estimated 126,100,000 man hours work for approximately 81,000 men, while an additional 129,725,000 man hours, requiring about 83,000 men, were needed to transport the raw material to the mills by boat and train. More than 24,730,000 man hours, representing work for about 16,000 employes, were necessary to convert coal to coke for use as fuel in blast furnaces. The total pay rolls of the corporations covering all units aggregated in 1934, $435,160,421. This sum is 59 7/10 percent of the total received for the domestic sale of iron and steel produced by the several corporations.

THE American Smelting & Refining Company has resumed operations of its Murray Lead Smelter. W. J. O'Connor, general manager for the company in the inter-mountain territory, with headquarters at Salt Lake City, announces that the plant will be kept in continuous operation during the fall and coming winter, and that this means probable work for 300 men, the largest number on their pay roll for several years.

ACCORDING to the American Iron & Steel Institute, for every ten men employed directly in the manufacture of steel, five are working to supply them with raw material. The Institute recently made a study of ten corporations which are completely integrated from ore mines to finishing mills and operating 26 pig iron and steel producing companies.

THE Anaconda Copper Mining Company early in October offered the public a new issue of fifty-five million dollars, 4½ percent debentures. For the first time in many years, the offering of a mining issue was over-subscribed.

UNITED STATES exports of copper in ore, concentrated, unrefined, refined ingots and bars, old and scrap, totalled 18,648 tons for September. For the period January to September, 1935 these exports amounted to 213,457 tons, a slight decrease in the amount for the similar period in 1934.

MINING operations will be resumed at the Star Mine in Burke, Idaho, by the Bunker Hill & Sullivan and Hecla companies, joint operators of the mine. The Wallace mill of the Hercules Mining Company will handle Star ores this winter. The daily tonnage during the early stages of operation will be 300 tons. Thirty-five men have already been employed and 100 will be added in the near future, with the mine crew to be further increased to approximately 200 men when mill operations reach 500 tons daily. The mill crew will number 15 men.

* * *

"The mining industry is confronted with probably greater difficulties at this time than it has encountered during its entire history. The industry as a whole—if our statistical data is correct—is of such magnitude and value to our national economic life that every effort should be made to preserve its present structure. All the existing and future problems, economic, social and otherwise, confronting it should not be hastily analyzed, but intently studied, with a clarity of purpose and profundity of thought, before any decisions are made. This responsibility for stabilization, improvement and protection lies with the industry itself."

E. A. Hamilton

Speaking before the annual Metal Mining Convention, Chicago, September 24, 1935.

* * *

CONSUMPTION of iron ore by blast furnaces, according to the Lake Superior Iron Ore Association, totalled 2,654,278 gross tons in September, which is an increase over the same period last year. As of October 1, there were 93 blast furnaces in operation, which is the largest number for October in a five-year period.

AT ITS Colstrip operations in Montana, the Northwestern Improvement Company for the 11-year period ending October 1, 1935, produced 10,149,827 tons of coal, and also handled 19,532,238 cu. yds. of overburden without a single fatality.

SEVENTEEN THOUSAND soft coal miners have been out in the Alabama district since September 23. Recently the Tennessee Coal, Iron and R. R. Company received a petition to reopen its captive mines, which was signed by the non-union workers who claim about half of the company's miners as members. So far it has been necessary to use military protection for properties in this district.

THE coal commission announced on October 29 that "careful study is being made of the provisions of the Coal Conservation Act of 1935 and more particularly of Section 14 of the Act which deals with the subject of bituminous coal purchases being made by departments or agencies of the U. S. Government." In the opinion of the counsel for the commission this section is mandatory, that purchases of bituminous coal in the case above mentioned shall be made only from producers who are members of the Bituminous Coal Code.

IT IS ESTIMATED that there are more than 13,000 illicit miners involved in the stealing of anthracite at the source. At the meeting of the Anthracite Club on October 23, Geo. H. Jones, superintendent, Stevens Coal Company, presented a four-reel graphic motion picture of this illicit industry. He stated that more than 3,500,000 tons of anthracite are being stolen in the southern fields annually, representing a dollars-and-cents loss to the industry of more than $18,000,000 each year. He estimates that the loss in railroad freight is more than $7,000,000 annually, and that the loss to the retail dealer is approximately $8,500,000 per year.

THE International Smelting & Refining Company, of Utah, has reopened the copper smelter at its Tooele plant. The reopening of this smelter, which had been idle for four years, was due to receipt of ores and concentrates from the Walker Mine in Plumas County, Calif., and from the Mountain City Copper Mine at Mountain City, Nev., both of which mines are controlled by International. Operation of this smelting unit adds 100 men to the company's pay roll.

THE KANAWHA COAL OPERATORS ASSOCIATION held its annual meeting at Charleston, W. Va., October 18. All the directors and officers were reelected, with D. C. Kennedy as executive secretary. C. A. Cabell, Carbon Fuel Company, was elected president; W. C. Mitchell, vice president; John L. Dickinson, treasurer. Mr. Kennedy will begin his thirty-first year as secretary of this group. He was elected to office in 1904. The directors of the association are Garner Williams, Cabin Creek Cons.

Coal Company; W. H. Pettus, Colcord Coal Company; P. C. Thomas, Koppers Coal & Transportation Company; W. C. Mitchell, Hatfield Campbell Creek Coal Company; John S. McKeever, Kanawha & Hocking Coal Company; F. L. Hornickel, Anchor Coal Company; A. W. Pollock, Spruce River Coal Company; F. O. Harris, Cannelton Coal & Coke Company; A. S. Wilson, Boone County Coal Corporation; John Laing, Wyatt Coal Company.

ON OCTOBER 12 the smokeless coal operators of West Virginia held their fifteenth annual rodeo, which was the most successful ever held by this group. Holley Stover served as toastmaster at the banquet.

. F. HOSFORD, Jr., head of the Bituminous Coal Commission, was scheduled to make his first address as chairman of the commission at the meeting of purchasing agents in New York, October 15. Mr. Hosford failed to appear because of press of business.

THE Social Security Board has been at work on the model compensation plan for states. Funds would be raised by a 3 percent contribution of payrolls. Weekly benefits of one-half of full-time wages, but not to exceed $15 maximum compensation. There are eight state and the District of Columbia Unemployment compensation acts. Copies may be obtained by addressing The American Mining Congress, Munsey Building, Washington, D. C.

THE total production of anthracite for the week ending October 19 amounted to 989,000 net tons. Bituminous production for the same period was approximately 8,000,000 net tons.

A NEW development in the company union picture is attracting much attention. Many believe it a direct outgrowth of the recent A. F. of L. convention action, whereby the executive council authorized the Amalgamated Association of Iron, Steel and Tin Plate Workers to submit at once a plan for organizing the steel industry. Events recently in the industrial mid-west indicate growing aggressiveness on the part of organizations not affiliated with the A. F. of L. The latest significant action was taken by 11 employe organizations in the plants of one steel company, when the workers, using their individual funds raised for that purpose, organized 23,000 workers into a single association and at a convention decided to ask for increased pay rates and other concessions. This was followed by similar steps in certain other steel plants, and active agitation of a similar nature has cropped out in rubber and automobile factories. The entire movement is regarded as the most significant in labor circles in the past five years by employers, industrialists, the A. F. of L., and the Labor Department, which sees in it either the formation of a huge national system analagous to the A. F. of L. (but probably in the hands of more radical leaders) or else the formation of hundreds of independent unions of an industrial nature, which may eventually be more powerful than present-day organizations.—A. M. C. Bulletin.

THE American Metal Company has purchased 21,500 shares of the common stock of the Consolidated Coppermines Corporation. Following the consummation of this purchase it is planned to resume operations at the Consolidated Coppermines properties in Nevada, which have been inactive since May, 1932.

THE Yuba Consolidated Gold Fields, through F. C. van Deinse, vice president, has announced that it will undertake a $2,500,000 development program in northern and central California during the next three years.

ARIZONA copper mining industry is showing renewed life with Inspiration Consolidated Copper Company's return to production after a three-year shutdown and with Phelps Dodge Corporation's announcement of a 25 percent increase in production. It is estimated that employment within the state will be materially increased during 1935 over the 1934 record.

THE Sierra Consolidated Mines have undergone a reorganization. J. J. Raskob, Jr., and R. P. Raskob have been elected directors. G. F. Morse, of Denver, is also elected a director. The Raskob interests are also identified with the Consolidated Virginia Mining Company, of Nevada, and are said to be negotiating for various other properties in this district.

THE Sunshine Mine of the Bunker Hill and Sullivan is sinking a new four-compartment 3,100-foot vertical shaft which will increase production capacity.

WM. B. GOHRING, formerly secretary of the Arizona Chapter of the American Mining Congress, more recently affiliated with the Apache Powder Company, recently was appointed one of six engineers to assist applicants in making loans from the Federal Government to promote mining development. Those selected are: For Arizona-New Mexico, Wm. B. Gohring; California, B. M. Snyder; Colorado, H. N. Lary; Nevada, R. A. Hardy Montana-Idaho, A. Grunert; and for Oregon-Washington and Alaska, A. E. Klitz.

THE Norfolk & Western Railroad propose to spend some $3,500,000 in extending its lines approximately 38 miles from Grundy, Va., into undeveloped territory. The railroad estimates that this territory contains several hundred million pounds of coal. In granting the authority to construct the lines, the ICC stipulated that the construction must be begun in six months and completed in two and one-half years.

A GENERAL meeting of District 11, Indiana Bituminous Coal Producers was held at Terre Haute, Ind., October 30. The producer members of the board elected are: W. R. Bootz, George A. Enos, A. V. Grossman, C. G. Hall, George J. Leahy, H. B. Lee, B. E. Lundblad; R. H. May, Earl Oliphant, John Shirkie, H. B. Smith, R. E. Snodberger; M. M. Soule, C. M. Templeton, Wm. J. Tipton, and W. M. Zeller.

WITH THE MANUFACTURERS

A NEW wall type acetylene cylinder manifold, the Oxweld Type M-8, has just been announced by The Linde Air Products Company, 30 East 42nd Street, New York, N. Y. It is available in a 10-cylinder unit to which extensions in units of 5 cylinders or 10 cylinders can be made. The new manifold has been accepted by Underwriters' Laboratories for listing under their reexamination service.

This company also has available on request a 20-page booklet entitled "The Utility of Carbide Residue." It explains in detail how owners of acetylene generators may capitalize on their valuable residual by-product.

"CONSUMPTION of electric power is setting a new record, business indices are upwards, private capital is circulating and the depression is definitely behind us," stated Ralph Kelly, vice president of the Westinghouse Electric & Manufacturing Company, in a recent address.

In his address he told of the complete reorganization of the company's divisions during the past few years. The Westinghouse organization today, he stated, is comprised of 21 divisions, a manager in charge of each with complete responsibility for the operation of his division. These managers, in turn, have the assistance and cooperation of a centralized broadly experienced executive group who work with them on the problems of sales, engineering, works management, stock control, industrial relations and other activities. Each of the units created under the new management, it was revealed, was a major industry in the scope of its operations and in the volume of its sales.

"The management unit form of organization," stated Mr. Kelly, "is the one with which Westinghouse faces its future. Each of the division managers, he reported, is comparatively young in years and is associated with a young enthusiastic personnel.

"The formation of these units," reported Mr. Kelly, "and the selection of the management personnel was harmoniously accomplished with little lost motion or business losses. Responsibilities have now been fixed, unnecessary operations eliminated, improvements in methods and products developed and we find ourselves able to benefit the company's position by numerous business improvements. The look ahead for the Westinghouse Company is very promising."

A NEW LINE of water-tight push-button master switches, mounted in molded phenolic-compound enclosures and intended for naval-type installations or equivalent industrial applications, has been announced by the General Electric Company, Schenectady, N. Y.

MINE SAFETY APPLIANCES COMPANY, Pittsburgh, Pa., has completed an informative new bulletin on the M S A Carbon Monoxide Indicator, a portable instrument designed to indicate the low concentrations of carbon monoxide in air which are universally recognized as dangerous. Executives interested in accurate means of determining the presence of this poisonous gas as a safeguard to employes or to users of their products, as the case may be, can secure advance copies of the new bulletin by writing the company direct, asking for Bulletin DS-1.

AT the meeting of the General Electric Company's board of directors, in New York City on November 1, Henry S. Morgan, of J. P. Morgan and Company, was voted to replace Thomas Cochran, former director, who resigned because of ill health. Robert C. Stanley, president of International Nickel Company, was also voted a member of the board, to fill a previous vacancy.

FIGURES released in September by the U. S. Bureau of Mines indicate that the total tonnage handled by mobile loaders, scrapers, duckbills, and other self-loading conveyors, as well as by various types of hand-loading conveyors, was 50,717,221 net tons in 1934. This was an increase of 9.6 percent over 1933. A full review of the mechanical loading situation in the coal mining industry is found in the 1935 Yearbook on Coal Mine Mechanization, published by The American Mining Congress and now available for distribution.

UNDER the National Housing Act coal cutters, conveyors, mine locomotives, loading machines, rock-dusting equipment and ventilation equipment have been added to the list of mining equipment eligible for loans under the act. Under the modernization plan, banks may loan up to $50,000, repayable in monthly installments over a period of five years for improvements in properties now in operation.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

OF THE MINING CONGRESS JOURNAL, published monthly at Washington, D. C., for October 1, 1935.

City of Washington,
District of Columbia, ss:

Before me, a notary public in and for the state and county aforesaid, personally appeared B. E. Chambers, who, having been duly sworn according to law, deposes and says that she is the business manager of THE MINING CONGRESS JOURNAL, and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse side of this form, towit:

1. That the names and addresses of the publisher, editor, and business manager are:

Name of publisher, The American Mining Congress, Washington, D. C.

Editor, E. R. Coombes, Washington, D. C.

Business manager, B. E. Chambers, Washington, D. C.

2. That the owners are: The American Mining Congress—a corporation, not for profit. No stockholders. President, Howard I. Young, St. Louis, Mo. Secretary, Julian D. Conover, Washington, D. C.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.

B. E. CHAMBERS,
Business Manager.

Sworn to and subscribed before me this 22nd day of October, 1935.

[SEAL] ELSIE L. LEISHEAR,
Notary Public.

(My commission expires January 31, 1939.)

CORRECTIONS

THE September issue of THE MINING CONGRESS JOURNAL stated that the Hanna Coal Company had established the world's record by producing a total of 3,229 tons of coal in 14 months without the loss of a single life. The figures should have been 3,000,229 tons.

THE October issue of THE JOURNAL carried an article "The Modern Electric Cap Lamp as an Aid in Cleaning Coal" by Gordon MacVean, of the Mine Safety Appliances Company. Mr. MacVean's name appeared inadvertently as "Borden MacVean." We greatly regret this error.

INDEX TO ADVERTISERS

OUR nation is large, too large for any individual to cope with all of the problems of mining. The American Mining Congress renders many specific services that are beyond the reach of most mining men. Let us explain more in detail any of the following:

Government Contacts
Coal Mine Modernization
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